Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

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Vol. 135 **December 1, 1959** **No. 11**

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AVMA Research Fellowships Available

The Council on Research of the AVMA announces the availability of a number of fellowships for postgraduate training for the academic year, 1959-1960.

The recipient of a fellowship must be a veterinarian and a citizen of the United States or Canada. Veterinary students who expect to graduate at the end of the current school year and who wish to follow a career in research may apply for a fellowship.

The latest date for filing the completed application is Feb. 15, 1960. Approximately one month is required for processing completed applications after receipt by the secretary of the Council. Qualified persons should secure and submit applications as early as possible to insure their file being complete for presentation to the Committee on Fellowships.

The Committee on Fellowships of the Council on Research will meet in March to consider applications, and the awards will be announced soon afterward. The stipend will be determined in each case by the needs of the individual, the location of the school in which he proposes to work, and other factors. In general, the stipends range from $100 monthly and upward.

Any qualified person interested in graduate training may obtain application blanks and other information by writing to Secretary, AVMA Council on Research, 600 S. Michigan Ave., Chicago 5, Ill.

A Hormone May Prevent Plant Growth

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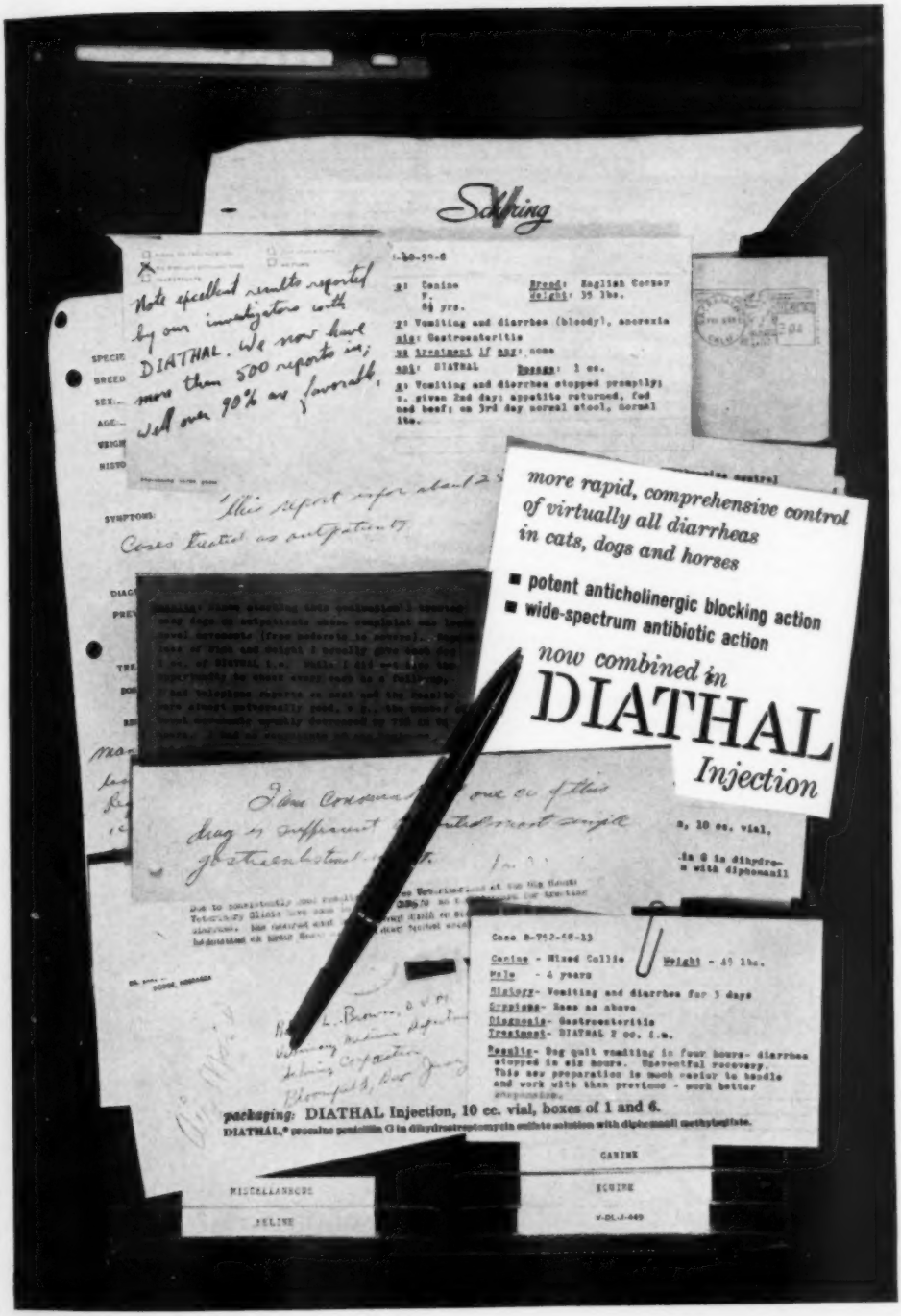
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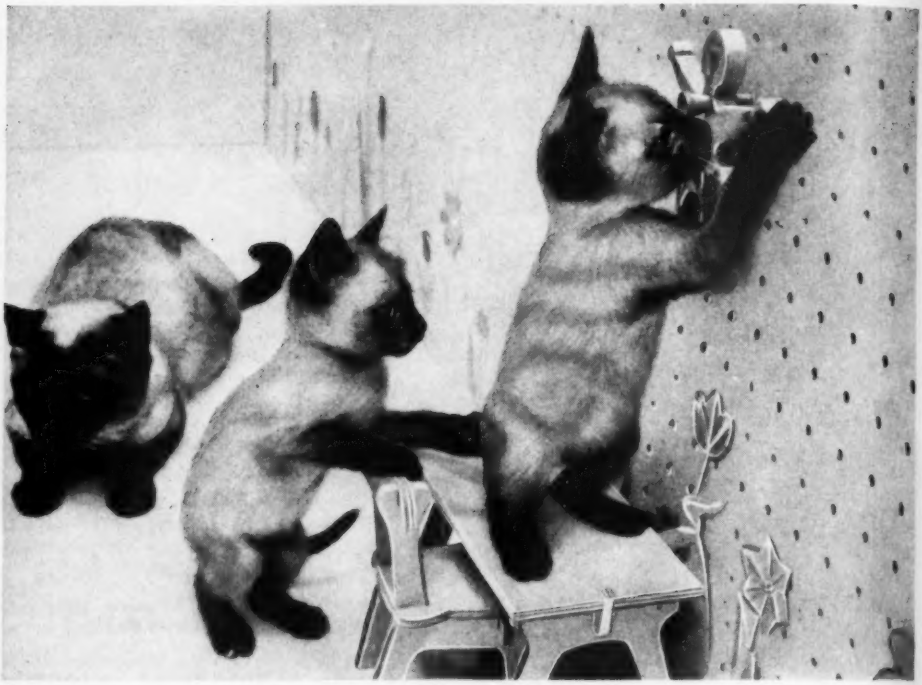

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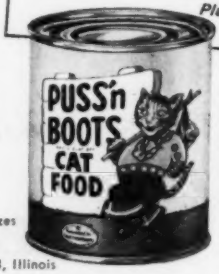

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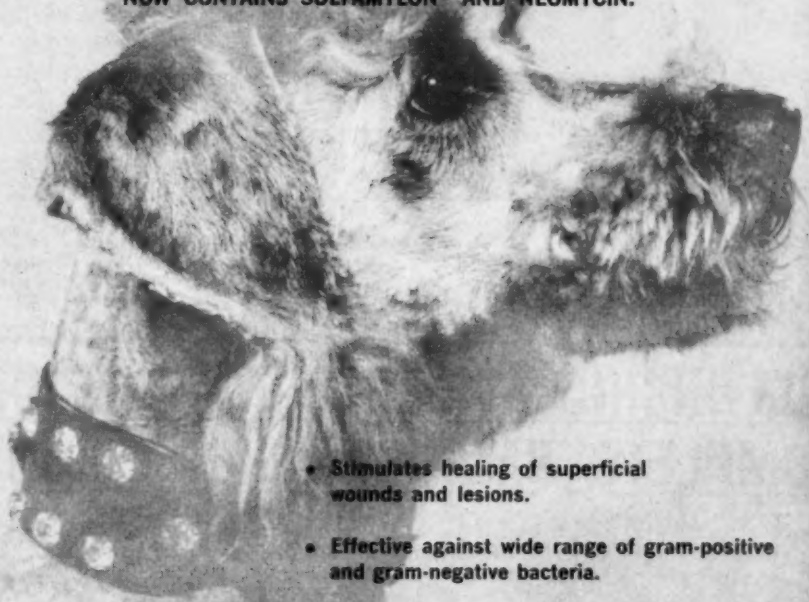

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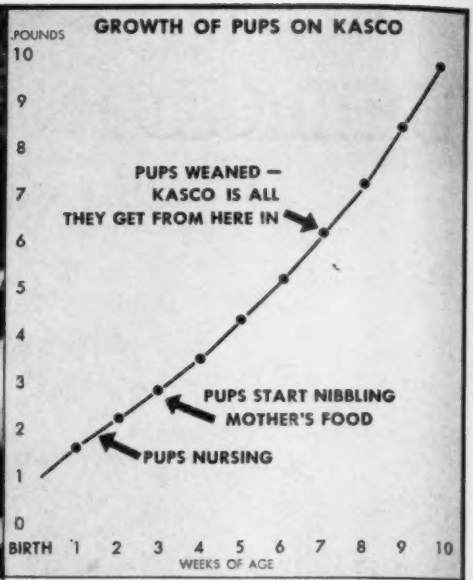

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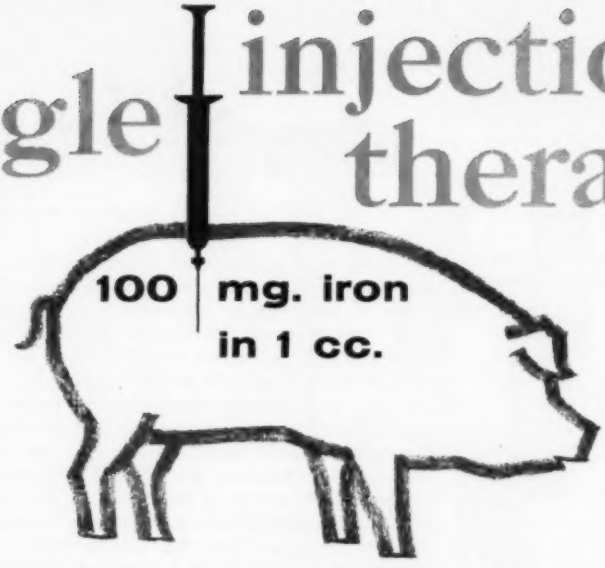

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FROM THE AVMA WASHINGTON OFFICE

Tax Deductions on Convention Attendance

Following is a summary of the recent ruling by the Internal Revenue applicable to persons attending medical and other types of meetings or conventions in the capacity of delegate: "A taxpayer who attends a convention or meeting as an appointed or elected delegate does not, merely because of that status, become entitled to deduct as business expenses the expenses incurred in connection with his attendance at such convention. In order to be deductible by him, the expenses must be incurred in carrying on the taxpayer's own trade or business activities as distinguished from those of another taxpayer or entity . . . . The allowance of deductions for conventions expenses as business expenses will depend upon whether the relationship between the taxpayer's trade or business and his attendance at the convention is such that by his attendance he is benefiting or advancing the interest of his trade or business." In other words, the ruling amounts to this — if his services as a delegate are primarily to advance the interest of the organization, travel expenses are NOT deductible; if undertaken for his own vocational gain, the deduction is allowable.

FAO Subcommittee Appointed

Subcommittee of U.S. Foreign Agriculture Organization Interagency Committee appointed for planning U.S. participation for International meeting on Veterinary Education, London, April 25-29. Members are: Dr. C. D. VanHouweling, chairman, and Drs. C. K. Mingle, C. A. Manthei, ARS, U.S.D.A.; R. E. Willie, AMS, U.S.D.A.; James Steele, Dept. of H.E.W.; Fred Kingma, F.D.A., Dept. of H.E.W.; Lt. Col. George Dixon, V.C., U.S. Army; Col. R. E. Miller, U.S.A.F. (V.S.).

Surgeon General Reports on Medical Education

The Dept. of Health, Education, and Welfare released a report of the Surgeon General's consultant group on medical education. It contains information on supply of physicians, problems of medical schools, and financing of training. Recommendations of the group are included. Those desiring a copy write U.S.P.H.S., Department of Health, Education and Welfare, Room 5521, North Bldg., Washington 25, D.C.

Postdoctoral Fellowships

December 22 is the deadline for postdoctoral fellowships to be awarded next March by the National Science Foundation. These are in biology, medicine, and psychology (other than clinical), also in physical and social sciences. Studies may be at American or foreign institutions. Annual stipend is $4,500, with dependency allowance for married fellows. Forms can be obtained from The National Academy of Sciences, 2101 Constitution Ave., N.W., Washington 25, D.C.

(Continued on adv. p. 14)

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New Grants for Research Scientists

The Public Health Service recently announced the award of 98 new grants totaling $3,461,700 to aid training programs for research scientists. Among disciplines aided are: surgery, pharmacology, biochemistry, genetics, microbiology, veterinary pathology, statistics, anatomy, obstetrics, and dermatology. Universities comprise the majority of the 53 institutional recipients; grants varied from $2,160 to $81,324.

Face Fly Invades 12 States

U.S.D.A. reports that the face fly, *Musca autumnalis,* was found for the first time this past summer in 12 northeastern and north central states, and as livestock pests in Ohio, Indiana, and Illinois. The fly was originally found in the United States in 1953 (Long Island), but prior to 1959 was known only in New York, Maine, and Virginia. ARS entomologists believe the face fly to be a potential carrier of eye diseases in U.S. cattle. Primarily a cattle pest, it will attack horses and sheep. The fly is reportedly common in Europe and Asia. The release (U.S.D.A. 2868-59-2) states, "in Russia the pest has been implicated in transmission of an eye worm that can cause blindness in cattle."

Screwworm Eradication Program In Southwest Not Feasible

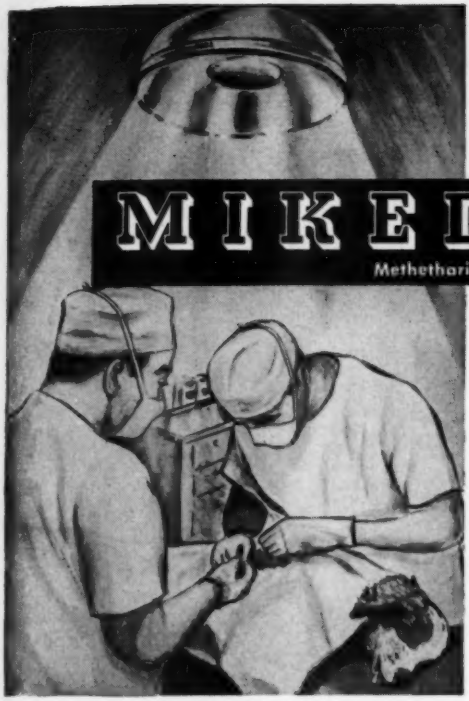
A U.S.D.A. report, released Oct. 27, 1959, stated that an all-out eradication program against screwworm in southwestern United States and adjacent Mexico is not feasible at present, and the problem requires further research and field trials on the sterile male, as well as a utilization of other techniques. A recent survey and evaluation of findings bearing upon feasibility of programs in the Southwest to effect an experimental program combining research and field trial would be quite costly. Factors taken into consideration which influenced this decision were the large size of infested area, and the lack of natural barriers to screwworm spread. Long-range aspects of any program would necessitate establishing some type of buffer zone to protect U.S. and adjacent areas of Mexico from infestation farther south.

Modified-Certified Brucellosis Areas

West Virginia was declared a modified-certified brucellosis area by U.S.D.A. effective October 9. A total of 22 states have now achieved certification. A U.S.D.A. release of Oct. 29, 1959, reported that 1,732 counties out of a total of 3,152 in the United States, Puerto Rico, and Virgin Islands, have achieved certification.

Civil Service's Bureau of Retirement Organized

The organization of the Civil Service Commission's newly established Bureau of Retirement and Insurance has been completed. It will administer the Federal Employee Health Benefits Act (P.L. 86-382), which becomes effective July 1, 1960. Named director and assistant director, respectively, were Andrew E. Ruddock and David F. Lawton, both government career men. Other key personnel appointed include Solomon Papperman, head of Health Benefits Task Force; Maurice S. Brown, actuary; Charles F. Overend, operations manager; and Joseph G. Crunkilton, assistant to the bureau director.



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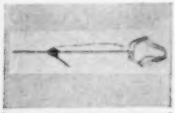

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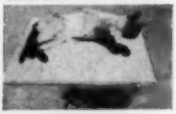

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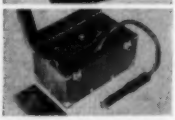

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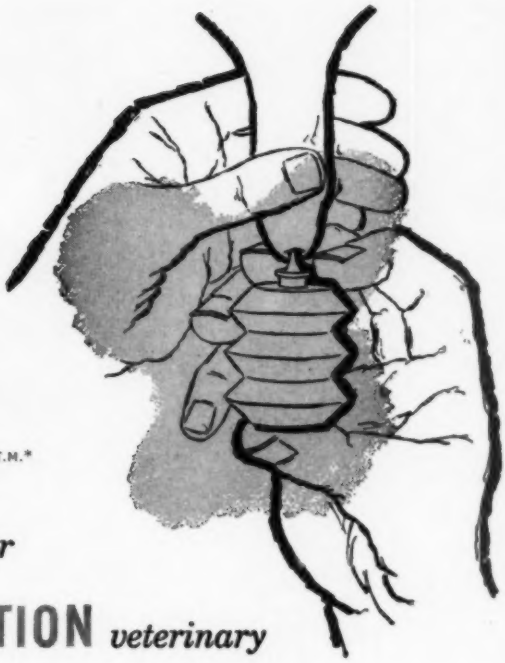

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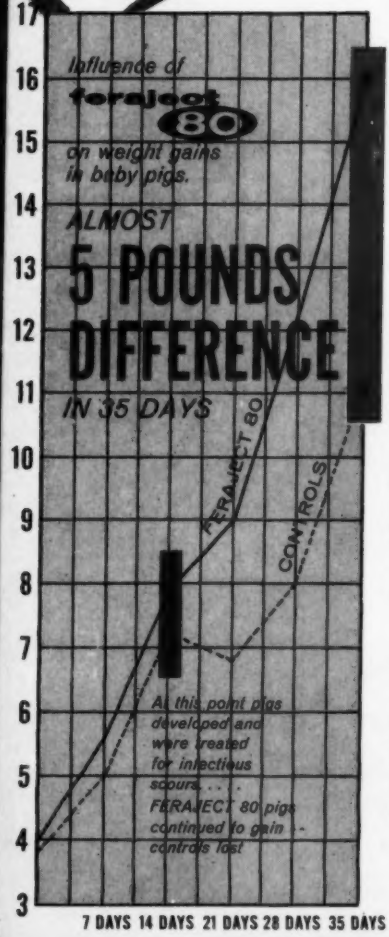

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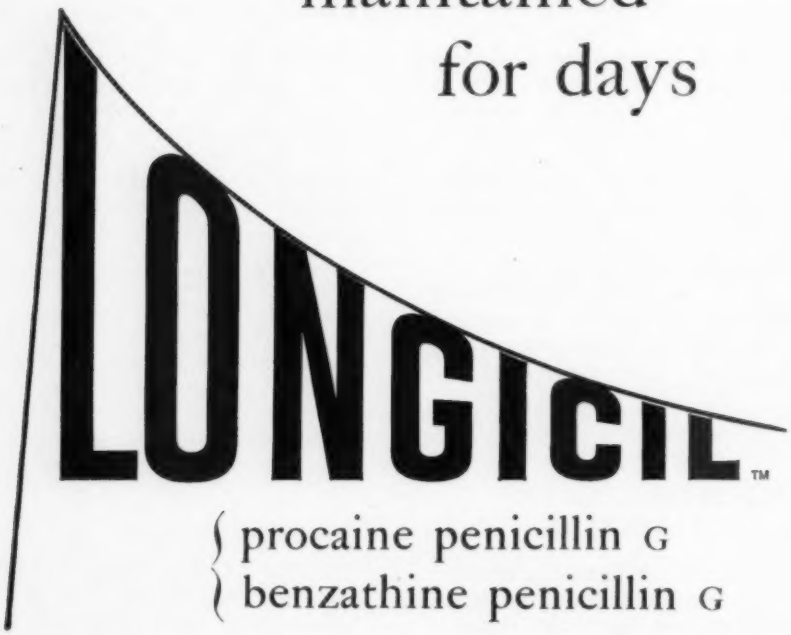

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Angiocardiography in Canine Dirofilariasis I. Preliminary Studies

H. P. HOBSON, D.V.M., M.S.

Auburn, Alabama

DIROFILARIA IMMITIS infections in the dog present a perplexing problem, to veterinarians throughout this country, particularly in the southeastern coastal areas.

The high evidence of microfilaria in the peripheral blood of dogs in the southeastern United States has been reported,[2,5,15] and although the possibility of a different filarid infection was mentioned, it was not demonstrated. The situation became clarified in 1956 when the adult of a second canine filarid parasite was demonstrated.[16]

There appears to be little correlation between the number of microfilaria (of Dirofilaria) in the circulating blood and the number of adults in the heart. Efforts to correlate microfilaria and adults have been, for the most part, to no avail.

Since, in most instances, the primary pathologic changes in canine dirofilariasis have been attributed to mechanical impairment of blood flow, it was postulated that this impairment could be shown radiographically with the aid of an intravenous contrast medium. The rapidity of the medium's progression depends upon the number of adult Dirofilaria present in the heart and pulmonary artery. In this way the infection can be evaluated quantitatively. The following project was undertaken in an attempt to determine the validity of this hypothesis.

LITERATURE REVIEW

Angiocardiography is defined as the roentgenologic visualization of the chambers of the heart and great vessels with the aid of an intravenous contrast medium.[1] Although medical literature abounds with descriptions of angiocardiography, there appears little such reference in veterinary medical literature. A reviewer[7] of the various iodinated compounds used in veterinary medicine included 70 per cent iodopyracet (Diodrast*) and 70 per cent sodium acetrizoate (Urokon**) as vascular contrast mediums.

There is a brief reference[3] to a dog heavily infected with Dirofilaria which showed gross dilatation of the pulmonary artery after contrast injection. In one report,[21] there are four normal angiocardiograms, an angiogram of a dog with femoral arterial occlusion, and an angiocardiogram of a clinical case of dirofilariasis. Two other writers[20] used angiocardiography as an aid in the diagnosis of a case of congenital pulmonic stenosis, which led to successful surgical correction.

In man, the use of this technique has been widespread. Its greatest value at present appears to be in the diagnosis and prognosis of the various congenital cardiac anomalies. Undoubtedly, angiology and angiocardiography would have been of value in the antemortem diagnoses of the various cases of congenital cardiac anomalies reported in veterinary literature.[2,4,6,9,10,12,13,14,18,20,21]

MATERIAL AND METHODS

On the basis of positive identification of microfilaria of *D. immitis* in the circulating blood, 15

Dr. Hobson, formerly an instructor in Small Animal Surgery and Medicine, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, is now a general practitioner at Carrollton, Ill.

This paper is an abridgment of a thesis presented to the School of Graduate Studies, Alabama Polytechnic Institute, as a partial fulfillment for the M.S. degree. It appears as paper No. 838, approved by the Committee on Publications, School of Veterinary Medicine. This work was performed with the cooperation of the K. A. Scott Canine Research Grant, Auburn.

The author is indebted to Dr. A. W. Hahn for aid in preparing the paper, and to Drs. Charles and Betty Phillips of Mobile, Ala. for help in securing infected animals.

*Diodrast is produced by Winthrop Laboratories, New York, N. Y.

**Urokon is produced by Mallinkrodt Chemical Works, St. Louis, Mo.

homeless dogs were selected from the Mobile, Ala., area and were brought to Auburn, Ala., for study. None of these dogs exhibited signs of clinical heart disease. Angiocardiography was performed on all these dogs in a left lateral recumbency. This position was chosen since it appears to give a composite view of the various cardiac chambers and major vessels and is easily duplicated.

Thirteen of the 15 dogs were tranquilized intravenously with chlorpromazine HCL (Thorazine†) (1 mg./lb. body weight) approximately ten minutes prior to the angiocardiographic procedure. The remaining 2 dogs were anesthetized with sodium pentobarbital (12 mg./lb. body weight).

Sodium acetrizoate (70 per cent) was chosen for the contrast medium. Sensitivity tests to this drug were not conducted on these dogs and would probably be of doubtful value in veterinary medicine; however, they are used in human medicine primarily for medico-legal reasons. Aside from a hypersensitivity to the medium, probably the most common toxic effect noticed will be transient cardiac arrhythmia.[1] This is probably due to a temporary ischemia, caused by the passage of a bolus of nonoxygen-containing fluid. Brief apnea often occurs and is followed by either a rapid shallow or a deep respiratory effort. Lowering of blood pressure at times is also prominent. Occasionally there may be central nervous system stimulation resulting in mild convulsions which can be alleviated by the use of an intravenous anesthetic agent.

The right cephalic vein was chosen as the site of routine injection. On subsequent occasions (*i.e.*, after several daily injections), it became necessary to use the left cephalic or jugular veins (due to extravasation of the irritating medium and local tissue reaction). In no instance was it necessary to isolate the vein surgically. However, in a small animal this procedure might be indicated. All injections were made through a 15-gauge needle which was inserted into the vein and was attached to a 2-ml. syringe filled with sterile saline solution. After determining the patency of the needle and its fixation within the lumen of the vein, a 30-ml. syringe containing the desired dosage (0.5 to 1.0 ml./lb. body weight) of sodium acetrizoate (70%) was then transferred to the needle in the vein. The injection was made as rapidly as possible, using 0.5 to 1.5 seconds, depending on the total dosage given.

The angiocardiograms were made at an exposure time of 0.05 second (250 milliampres, 36 inch film-anode distance, par speed screen, and a Campbell-Lysolm grid). The kilovoltage was varied according to the thickness of the thorax. The exposures were routinely made eight seconds after the beginning of the injection of the contrast medium. At this time, most of the right side of the heart has been cleared of contrast medium and the thoracic aorta has just become opacified in essentially all normal animals. In prolonged periods of administration, as with large amounts of medium or injection through a small needle, the clearing time for the right side of the heart becomes prolonged. However, aortic opacification time is not affected.

Various types of surgical procedures were performed on some of these dogs. The type of operations, the number of parasites removed, and an attempt to objectively review each case by recording its significant angiocardiographic characteristics are listed (table 1). Angiocardiography was also done on several normal dogs and the results are presented as a basis of comparison to those infected with Dirofilaria.

RESULTS

The first illustration (fig. 1) is that of a normal (uninfected) dog in a left lateral recumbent position. The heart of this dog was essentially normal in size and shape. The contrast medium had traversed and cleared the right side of the heart and was opacifying the pulmonary veins (P.V.), left atrium (L.A.), left ventricle (L.V.), aorta (AO), and aortic branches. Notice in this case that the precava, right atrium, and right ventricle contain no contrast.

The second illustration (fig. 2), also that of a normal dog with no necropsy findings of dirofilariasis, is an angiocardiogram of the right side of the heart and the lesser or pulmonic circulation. Contrast medium was injected into the right cephalic vein and may be seen traversing the anterior vena cava (AVC), regurgitating into the vena azygos (AZ), and the posterior vena cava (PVC). There is also retrograde flow into the jugular and contralateral cephalic vein as well as the costocervical and internal thoracic veins. Both right atrium (RA) and ventricle (RV) are well filled with contrast medium. The heart is in diastole. The right auricle (or auricular appendage) (RAA) may also be seen. The pulmonary arteries, both right (RPA) and left (LPA) branches, are observed, as are the branches to the several lobes of the lungs. Contrast medium is retained within the gallbladder due to a prior injection (4 hours earlier) and hepatic concentration. This angiocardiogram was taken approximately 2.67 seconds after injection.

An angiocardiogram (fig. 3) taken eight seconds after injection of contrast medium shows an essentially normal flux through the cardiopulmonary circuit. On necropsy,

†Thorazine is manufactured by Pitman Moore & Co., Indianapolis, Ind.

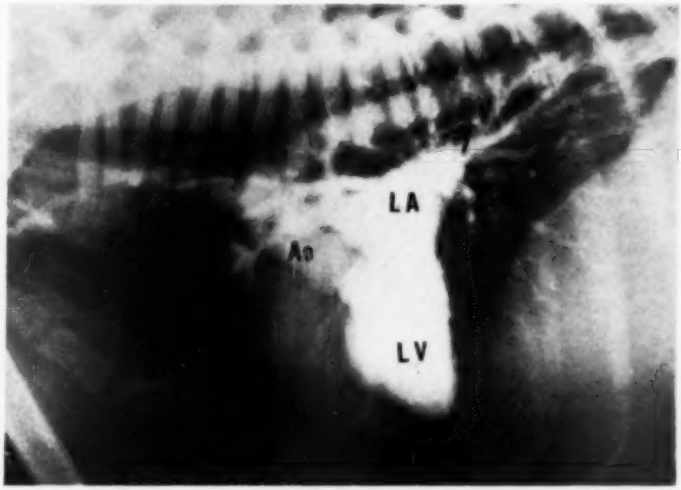


Fig. 1—Angiocardiogram of normal dog taken eight seconds after injection of contrast medium. Notice the pulmonary veins (PV), left atrium (LA), left ventricle (LV), and aorta (Ao).

12 adult heartworms were removed from the right ventricle.

An angiocardiogram (fig. 4) was taken of a dog which, upon necropsy, was found to have 20 adult heartworms. In this case, the heart is slightly dilated, but is retaining considerable contrast medium in its right side. However, the aortic opacification and visualization of the left side of the heart are moderately good.

Retention of contrast medium in the right auricular appendage was demonstrated (fig. 5). At necropsy, this dog was shown to have 17 adult heartworms. In this angiocardiogram, there is also slight retention in the right side of the heart, good opacification of the left side of the heart, and moderate to good visualization of the aorta.

The angiocardiogram (fig. 6) of dog 20, the one animal of this series showing the greatest number of heartworms, does not show any great impairment of circulation. This radiograph shows a slight amount of contrast medium in, and slight to moderate dilation of, the right ventricle.

One early angiocardiogram (fig. 7) taken approximately 3.5 seconds after injection

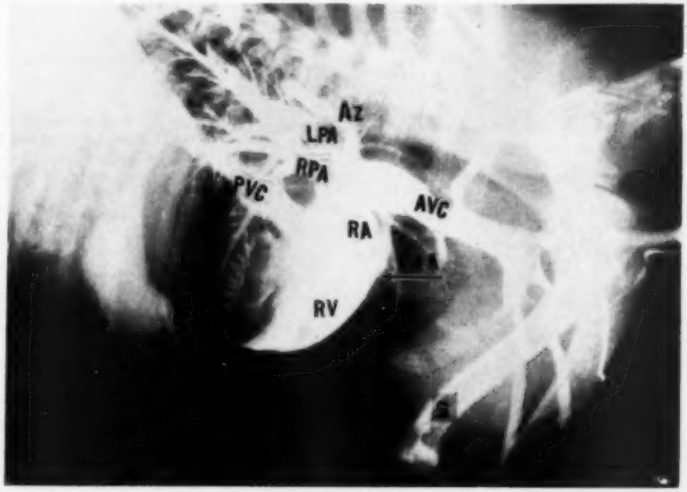
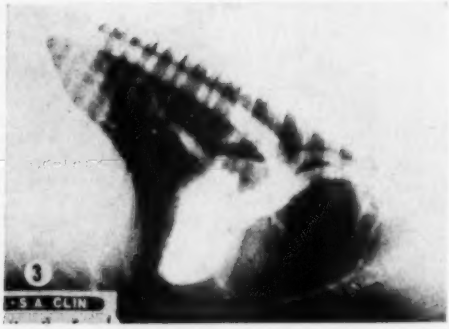
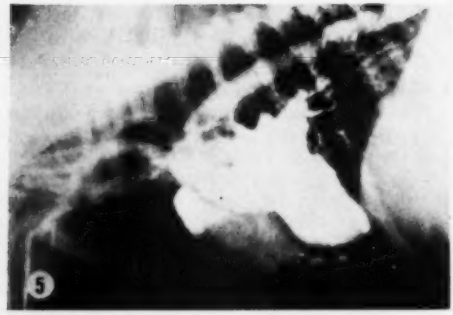
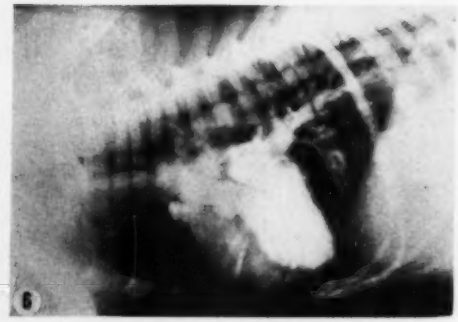


Fig. 2—Angiocardiogram of normal dog taken 2.67 seconds after injection of contrast medium. Notice the anterior vena cava (AVC), vena azygos (AZ), posterior vena cava (PVC), right atrium (RA), right ventricle (RV), and right auricular appendage (RAA).







(multiple angiocardiography on rapid film changer—*see* fig. 2), shows contrast medium essentially in the right side of the heart. The right side of the heart and anterior vena cava are well filled with contrast medium, and there is dilation of both branches of the pulmonary arteries. The contrast medium appears to be streaked in the more distal portions of this artery. This phenomenon has been observed on later occasions and will not be discussed here.[8]

An angiocardiogram (fig. 8) was taken five seconds after injection of 70 cc. of 100 per cent oxygen into the jugular vein. Notice especially the area of the pulmonary artery. It is the opinion of the author that adult Dirofilaria may be faintly visible against the radiotransparent oxygen contrast.

Pretreatment and post-treatment angiocardiograms (figs. 9 and 10, respectively) were taken of a dog with dirofilariasis at the Small Animal Clinic, Alabama Polytechnic Institute, Auburn. The second angiocardiogram (fig. 10) was taken approximately two months after treatment with arsenicals. Contrast progression is poor in the pretreatment angiocardiogram with retention in the right side of the heart and precava, whereas in the post-treatment radiograph, the circulation appears to be almost normal, in that the right side of the heart is well cleared of all (or almost all) contrast medium.

An angiocardiogram (fig. 11) with an exposure taken eight seconds after an injection to a Boxer from the Miami, Fla.,

Fig. 3—Angiocardiogram taken eight seconds after injection of contrast medium. Although 12 heartworms were removed from this dog, the progression of medium is essentially normal.

Fig. 4—Angiocardiogram taken eight seconds after injection of contrast medium; 20 heartworms were removed at necropsy. Notice the retention of contrast medium in right side of heart.

Fig. 5—Angiocardiogram taken eight seconds after injection of contrast medium. 17 heartworms removed at necropsy. Slight retention of contrast medium is present in the right side of the heart.

Fig. 6—Angiocardiogram of dog 20, from which 36 heartworms were removed. Taken eight seconds after injection of contrast medium. This dog does not show the great impairment of circulation as would be expected with this large a parasite burden.

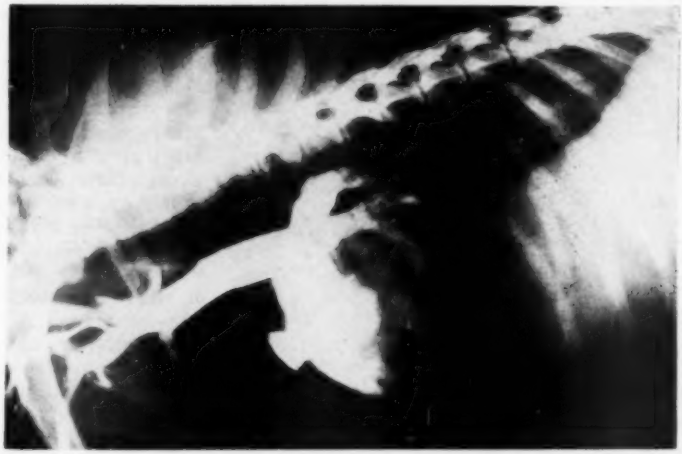


Fig. 7—Early angiocardiogram taken three and one-half seconds after injection of contrast medium. Notice the streaking patterns in the more distal portion of the pulmonary arteries.

area* reveals extremely poor circulation and considerable amount of contrast medium in the pulmonary arteries and right side of the heart. Notice the gross dilatation and tortuosity of the pulmonary arteries. This dog was subjected to arteriotomy of the branch of the left pulmonary artery going to the diaphragmatic lobe of the lung, and approximately 125 heartworms were removed prior to the angiocardiographic procedure. This postoperative radiograph reveals that many more heartworms probably abound in the other branches of the pulmonary artery.

Fig. 8—Angiocardiogram taken five seconds after injection of 100 per cent oxygen into the jugular vein. Notice especially the lacy appearance in the area of the pulmonary artery.

DISCUSSION

From studying the illustrations, one might conclude that canine dirofilariasis can cause an impairment of blood flow as visualized by angiocardiography. However, the dog may carry a moderately heavy infection without showing significant impairment (fig. 3). This may be due to the location of the parasites. As would be expected, the limited number of cases presented here seems to indicate that the impairment is greatest when the parasites are located in the pulmonary arteries.

Late in this project, another phase of angiocardiography[17] came to the attention of the author. The radiographic value of gases as contrast medium has long been known and utilized. The danger of these

Fig. 9—Angiocardiogram taken eight seconds after injection of contrast medium. This dog was subjected to treatment with arsenicals (compare with fig. 10).

*The author is indebted to Dr. C. E. Bild, Miami, Fla., for furnishing this case for study.

Fig. 10—This angiocardiogram was taken eight seconds after contrast medium injection. This is the same dog as shown in figure 9, approximately two months after arsenical treatment.

gases inadvertently injected intravenously is also well known. As a result, little investigation has been carried out as to the use of gases as contrast mediums in cardiovascular radiography. It was then thought to be appropriate to try this rather radical approach to intravenous contrast angiocardiography (fig. 8). The result was of interest, and this method should be investigated further in clinical dirofilariasis.

Dilatation of the right ventricle was a rather consistent finding, and may be diagnosed with greater accuracy by the use of contrast medium. Dilatation and distortion of the pulmonary arteries was evident in heavily parasitized animals.

It is unfortunate that there was not a wider range in the number of adult heartworms harbored by the experimental dogs. None of these dogs had a severe infection. The radiographs presented from the severely affected animals were not in the original study, but are included here to demonstrate some additional findings.

Although not all of the angiocardiograms obtained are presented in this report, the general findings are listed (table 1). It appears that not always do the frank numbers of heartworms present determine the severity of infection. More than numbers, it would appear that location of worms would be most important. The possible explanation for the rather nonuniform findings reported in this preliminary study, is that location (ventricular or arterial) would affect to a high degree the angiocardiographic evaluation of dirofilarial infection.

SUMMARY

Fifteen dogs from an area of high Dirofilaria incidence (Mobile, Ala.) were subjected, under sedation or anesthesia, to a rapid intravenous injection of 0.5 to 1.0 ml. of 70 per cent sodium acetrizoate (Urokon) per pound of body weight. A left lateral recumbent angiocardiogram was taken eight seconds following contrast injection. Some of these angiocardiograms are presented, along with a tabular listing of all made and also several others made during rapid multiple exposure angiocardiography at an earlier time. Both tech-

Fig. 11—Angiocardiogram taken eight seconds after injection of contrast medium. Approximately 125 heartworms were removed surgically before angiocardiography. Many more are probably present.

TABLE I—Summary of Pertinent Angiocardiographic Features of Dogs Infected with Dirofilaria immitis

Dog No.	Surgery performed	Dirofl. at surgery		Dirofl. at necropsy	Total dirofl.	Significant angiocardiographic findings
		Vent.	P.A.*			
HW1	No	—	—	20	20	Moderate dilatation of right ventricle with retention of some contrast in right side of heart.
HW3	No	—	—	7	7	Minimum of contrast retained in right side of heart.
HW4	No	—	—	10	10	Moderately dilated right ventricle with some retention of contrast in that side.
HW12	Yes—ventriculotomy	6	—	1	7	Slight retention in right side of heart preoperatively.
HW15	Yes—left P.A.	—	4	4	8	Right ventricle shows dilatation; aorta only slightly opacified.
HW16	Yes—ventriculotomy	10	—	6	16	Contrast retention in right auricular appendage.
HW17	No	—	—	14	14	Moderate right ventricular dilatation and some contrast retention in right side of the heart.
HW20	Yes—ventriculotomy	25	—	11	36	Right ventricle more dilated postoperatively and showed poorer circulation.
HW21	No	—	—	20	20	Only slightly dilated right ventricle but considerable retention of right side of heart and only moderate aortic opacification.
HW22	Yes—ventriculotomy	11	—	7	18	Rapid multiple angiocardiography and cinefluorography performed; early angiocardiograms show dilation of and streaking in P.A.; moderate retention of contrast in right side of heart preoperatively.
HW25	Yes—main P.A.	—	22	0	22	Moderate retention of contrast in right side of heart preoperatively.
HW29	No	—	—	Not performed		Essentially normal.
HW30	No	—	—	17	17	Slight dilatation and retention of contrast in right ventricle and rentention in right auricular appendage.
HW32	No	—	—	18	18	Right ventricular dilatation and some retention of contrast in right side of the heart.
HW40	No	—	—	12	12	Essentially normal.

*P.A. denotes pulmonary artery.

niques demonstrate the impairment in circulation. The use of intravenous gases is briefly mentioned, and a gaseous contrast radiograph of a Dirofilaria-infected dog is shown.

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The Case Against BCG

Numerous preparations intended to produce immunity to tuberculosis have been developed since 1882. The one now in the ascendency is Bacillus Calmette-Guerin (BCG). None of these preparations has passed the controversial stage. In various parts of the world where only fundamental methods have been employed, as good results or better have been reported as in other places where BCG has been added.

Great decreases have taken place in the United States since 1930 in mortality, morbidity, and tuberculin positivity. The pool from which future cases will arise is the approximately 50 million persons who have a positive tuberculin test and those whom they infect. Most present tuberculin reactors are 40 years or older. Among the remainder, the still decreasing tuberculous infection attack rate has become so low that relatively few may be expected to become infected.

The tuberculin test is exceedingly important in differential diagnosis and is the best epidemiological agent. It very early signals the invasion of the body by tubercle bacilli at a time when drugs can best act upon them. All values of the tuberculin test are lost to the person whose tissues have been sensitized to tuberculin by BCG.

The use of the tuberculin test as a screen has led to almost complete eradication of tuberculosis in the 95,000,000 cattle in the United States. BCG would have made this accomplishment impossible.

If tuberculosis eradication is the consideration, mass BCG administration campaigns, as well as those for special groups such as students of nursing and medicine, are puzzling. To spend time, effort, and funds on individuals who have not been infected (and many of whom will not be), instead of concentrating on the infected who will inevitably produce continuing crops of contagious tuberculous persons, is bad economy medically and financially.

To speak of unavoidable exposure groups such as students of nursing and medicine is a reflection on the administration and administrative staff of any hospital or professional school, as adequate protection measures are now available.

A carefully controlled study with standards of control comparable to those demanded in other fields has never been conducted. The Aronson studies on American Indians is a good example. This favorable effect becomes less impressive when one observes even better results in groups of American Indians where no BCG has been used.

Among cattle, BCG failed. Among people, the most phenomenal accomplishments have been achieved where little or no BCG has been used (Iceland, Hawaii, the Netherlands, and the United States.)

Bacteriologic investigations have revealed that cultures designated BCG were not composed of just one, but of multiple bacterial forms, some of which were invasive for animal tissues. Since no two cultures were alike, changes had occurred in each of the cultures studied. Apparently, mutants have evolved capable of producing destructive disease in animals on deficient diet, in those which were silicotic, and in at least two species of normal animals. In human beings, they have many times caused lesions at the site of administration and in the regional lymph nodes and, in some cases, even death.

The authors have pointed out the lack of proof that BCG has aided in the control of tuberculosis anywhere.—*By 17 American Authors in Brit. M. J., June 6, 1959.*

Pasteurella tularensis in Horses

During the course of an acute febrile disease in a small group of horses in Montana, *Pasteurella tularensis* was isolated from 2 foals and a rise in specific agglutinating antibody was demonstrated in others. These horses were pastured in an area known to be infested with ticks and where tularemia is enzootic in wildlife.—*K. D. Claus et al. in J. Bact., 78, (Aug., 1959): 294.*

The Desirability of Stockpiling Anti-Hog Cholera Serum in Case of an Epizootic of Hog Cholera

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Washington, D.C.

THE NECESSITY for stockpiling anti-hog cholera serum for emergency use in epizootics of hog cholera has been discussed many times. Before attempting to arrive at a solution, it is essential to define the size of the outbreak that might occur. In discussing this subject, it is usually assumed that the epizootic would be similar to the one which occurred in 1926. Before accepting this assumption, some facts in regard to the production of swine and of anti-hog cholera serum and hog cholera virus should be considered.

At the time of the epizootic in 1926, the serum industry was obligated only to owners and stockholders. As a result, the production of serum was conducted on a so-called "boom or bust" basis. When production animals were cheap, and if the serum producer was financially able to buy extra hogs, large quantities of serum were produced. Then as soon as hog prices rose, these manufacturers virtually stopped producing serum.

Prior to the 1926 epizootic, the price of hogs was high and consequently large numbers of pigs were farrowed. As a result, serum sold rapidly and the supply was quickly decreased. Because hog prices were high, only small quantities of serum were manufactured to replace that being used. However, due to increased hog production, the price of hogs fell but cholera became prevalent before adequate serum became available.*

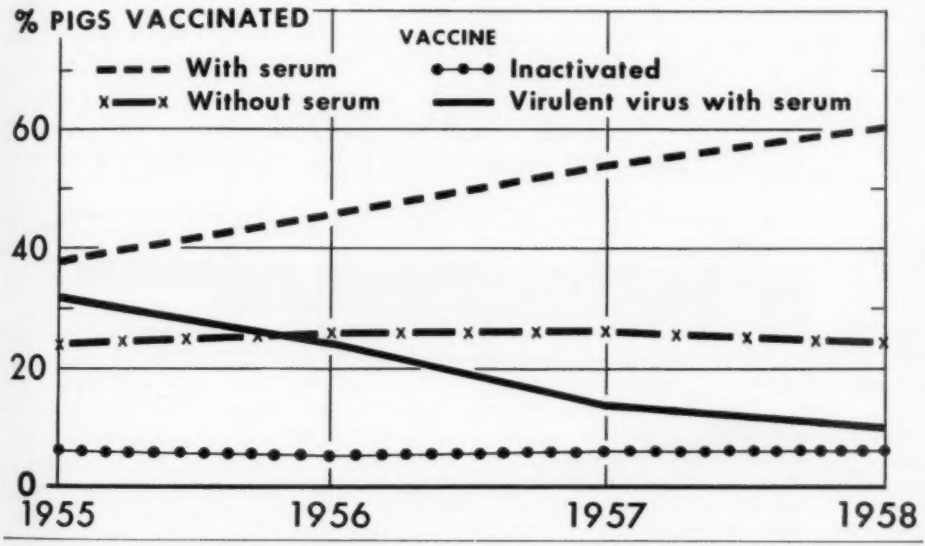

Fig. 1—Changes in the marketing of hog cholera viruses.

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*Taken from the promulgation record of the Marketing Order which became effective in 1936.

Under present laws, each manufacturer of anti-hog cholera serum, regardless of the cost of production or any other factors, is required to have in his possession, on April 1 of each year—or any date as permitted by the Secretary of Agriculture between January 1 and May 1—an amount of serum equivalent to not less than 40 per cent of his previous year's sales.

Usually it is found that the serum reserves range from 40 per cent to sometimes as much as 100 per cent of the previous year's sales. Most of the time the industry average is higher than 45 per cent. If the serum in the hands of wholesalers, druggists, veterinarians, and others is also taken into account, it is believed that the total serum reserve would probably be doubled.

Annual vaccination of 50 to 65 per cent of the swine appears to have prevented epizootics of the proportion of that in 1926. Each year sporadic outbreaks do occur, but have been limited to small areas. However, since the disease spreads only until it encounters immune swine, the epizootic will be limited as long as over 50 per cent of the swine have been immunized.

The date when the 40 per cent emergency reserve is required is set to coincide with the beginning of the vaccination season. This is because preventive vaccination is the accepted practice, rather than the therapeutic use of immunizing agents.

Therapeutic vaccination is of little value in hog cholera. The prophylactic use of serum in approximately half of the pigs produced maintains a constant outlet for serum.

Since approximately 60 per cent of the total annual pig crop is farrowed in the spring of the year, a supply of 40 to 50 per cent of the previous year's sales would seem to insure an adequate supply for pre-

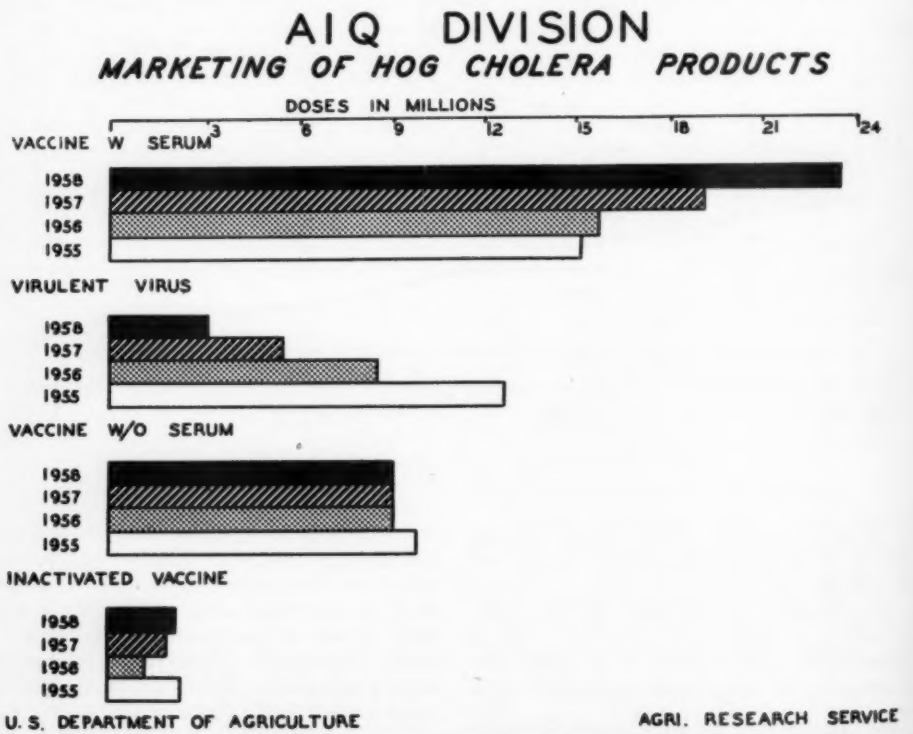

Fig. 2—Changes in the marketing of hog cholera products.

TABLE 1—Changes in Marketing of Hog Cholera Viruses

Year (1955)	Vaccine w serum		Vaccine w/o serum		Inactivated vaccine		Virulent virus		Total sales or pigs vaccinated	Percentage of total annual sales
	(Doses)	(%)	(Doses)	(%)	(Doses)	(%)	(Doses)	(%)	(Doses)	Viruses-Serum
Jan.-June	8,936,969	37	5,887,309	24	1,481,039	6	7,997,699	33	24,303,016	59.4 - 56.3
July-Dec.	6,443,174	39	4,061,556	24	819,196	5	5,287,384	32	16,611,310	40.6 - 43.7
Total	15,380,143	38	9,948,865	24	2,300,235	6	13,285,083	32	40,914,326	
1956										
Jan.-June	8,799,288	44	5,072,431	25	1,173,838	6	4,831,827	25	19,877,384	56.0 - 55.6
July-Dec.	7,230,132	46	4,158,337	27	710,580	5	3,520,429	22	15,619,478	44.0 - 44.4
Total	16,029,420	45	9,230,768	26	1,884,418	5	8,352,256	24	35,496,862	
1957										
Jan.-June	10,738,833	53	5,231,187	26	1,245,237	6	3,065,802	15	20,281,059	56.7 - 54.8
July-Dec.	8,668,239	56	3,842,119	25	913,764	6	2,040,968	13	15,465,090	43.3 - 45.2
Total	19,407,072	54	9,073,306	26	2,159,001	6	5,106,770	14	35,746,149	
1958										
Jan.-June	11,740,958	59	5,000,286	25	1,310,069	7	1,887,596	9	19,938,909	52.8 - 49.5
July-Dec.	10,831,946	61	4,166,008	23	946,406	5	1,890,010	11	17,834,370	47.2 - 50.5
Total	22,572,904	60	9,166,294	24	2,256,475	6	3,777,606	10	37,773,279	

ventive vaccination. According to the Department of Agriculture's figures, sales for each year since 1936 have averaged about two times the inventory available on May 1.

Less Serum Required In Vaccination

The number of swine that can be immunized with a given quantity of serum has changed materially. In 1950, prior to the widespread use of the modified virus vaccines, 1,667,790,000 cc. of serum was used in vaccinating 55,772,000 pigs, or an average of 30 cc. per pig. This total included pigs vaccinated with inactivated vaccines, the only vaccines then on the market. In 1958, 611,461,398 cc. of serum was used on 37,773,279 pigs, or an average of slightly more than 16 cc. per pig.

To vaccinate 100 pigs in 1950, it would have required 200 cc. of virulent virus and 3,500 cc. of serum whereas, in 1958, with only 10 of 100 pigs vaccinated with virulent virus and serum (fig. 1, 2), the 10 pigs would have required 20 cc. of virulent virus and 350 cc. of serum. Of the remaining 90 pigs, 6 would have been vaccinated with inactivated vaccine (30 cc. of vaccine but no serum), 60 would have been vaccinated with modified vaccine requiring the use of serum (120 cc. of vaccine with 600 to 900 cc. of serum, depending on the operator and the vaccines), and 24 would have been vaccinated with modified vaccines, with which the use of serum is optional (48 cc. of vaccine and a quantity of serum ranging from none to 360 cc., depending on the operators).

In analyzing the above figures, it appears that if each pig were to have been immunized in 1950, it would have required an average of 35 cc. of serum. In 1958, the figures averaged from 9.4 to 16.1 cc. per pig to be immunized, depending upon the vaccine used.

On May 1, 1950, there were 665 million cc. of serum available for vaccination, which would have immunized 19 million pigs. On May 1, 1958, there were 291.3 million cc. available which would be ade-

TABLE 2—Sales of Anti-Hog Cholera Serum by Months

	1955		1956		1957		1958	
	(cc.)	(%)	(cc.)	(%)	(cc.)	(%)	(cc.)	(%)
Jan.	32,963,625	4.2	35,058,940	5.3	34,127,680	5.6	33,988,270	5.5
Feb.	29,399,560	3.7	37,294,225	5.6	37,981,895	6.3	28,443,440	4.6
Mar.	48,000,725	6.1	61,575,383	9.3	43,749,315	7.2	37,551,165	6.1
Apr.	84,783,145	10.9	64,624,125	9.8	61,781,425	10.2	61,441,030	10.0
May	115,476,525	14.8	82,681,325	12.5	78,460,760	13.0	63,704,218	10.4
June	126,487,115	16.3	83,028,765	12.6	75,444,370	12.5	77,973,500	12.7
July	64,440,255	8.3	60,359,290	9.1	52,414,260	8.7	53,609,150	8.7
Aug.	59,468,535	7.6	50,128,450	7.6	49,366,120	8.2	55,009,225	8.9
Sept.	70,543,120	9.0	44,046,620	6.7	46,053,140	7.6	49,429,570	8.0
Oct.	48,008,680	6.1	44,478,915	6.7	41,514,340	6.8	52,323,395	8.5
Nov.	53,325,490	6.8	49,113,050	7.4	42,254,395	7.0	53,750,265	8.7
Dec.	42,574,150	5.4	44,600,830	6.7	38,667,590	6.4	44,238,170	7.2
TOTAL	775,470,925		656,982,718		601,822,290		611,461,398	

quate to immunize between 19.5 and 29.0 million pigs, depending on the method and use of serum with those vaccines which require it.

There is some indication that vaccines could be used alone or in combination with small amounts of serum in areas where exposure could be averted for four to seven days. This should not be ignored in any case where preventive measures are desired.

It also appears from monthly sales figures (tables 1 and 2) that extremes in pig production are not as pronounced as they were prior to 1956.

Although it appears that adequate supplies of serum are available to meet possible outbreaks of hog cholera, it would be possible in emergencies to institute other measures to speed up the availability of anti-hog cholera serum being produced. The removal of certain tests relative to potency could be eliminated without hazard under emergency conditions, and would decrease the time required for the production and testing of serum by 14 days.

CONCLUSIONS

It appears that the anti-hog cholera serum reserve requirement of 40 per cent is adequate. Emphasis should be placed upon preventive vaccination as long as hog cholera is a problem. If pigs are vaccinated at the proper age they will be protected when hog cholera appears. This is especially important with the spring pig crop since hog cholera most often appears in the summer.

Stockpiling serum instead of emphasizing the increased vaccination of pigs would in effect subsidize bad swine production methods. Decreased vaccination would increase the number of susceptible swine. At the same time, the continued decrease in the use of serum, with the subsequent reduction in sales, would reduce the amount of serum required by law under the 40 per cent reserve. This in turn would reduce the amount of serum available to swine producers.

Hog Cholera Breaks in Britain

In the past five years, the number of herds affected with hog cholera (swine fever) in Britain varied from 741 to 1,455. In 1958, when not more than 10 per cent of all pigs were vaccinated with crystal violet vaccine supplied by the Ministry of Agriculture, most affected herds (74%) were unvaccinated. In most other affected herds, the disease appeared in unvaccinated animals.

The disease was confirmed in only 14 of 2,000 registered herds which were vaccinated regularly. In these herds, the disease almost invariably appeared in pigs either not yet vaccinated (9 herds) or soon after vaccination; the older, vaccinated swine resisted the infection. Investigations indicate that it is unlikely that the infection was introduced either by the veterinarian or in the crystal violet vaccine. It was believed more probable that the disease had been introduced from other sources shortly before or after vaccination.—*Vet. Rec. (May 30, 1959)*: *450.*

Virulent Hog Cholera Virus Carried by Immune Swine

Of swine which had been vaccinated with crystal violet hog cholera vaccine, 20 per cent eliminated virulent virus in their feces and urine for one to seven days after oral or cutaneous exposure to virulent virus. The quantity of virus absorbed seemed to make no difference. The lesions, mild but characteristic of hog cholera, seemed to indicate that virus multiplication had occurred although the virus could not be identified in the tissues.—*F. Fuchs in Arch. f. Exptl. Vet.-med., 13, (1959)*: *457.*

Tenth Day Critical in Eye Injuries

Development of sympathetic ophthalmia rarely, if ever, occurs before the tenth day following injury and seems most apt to occur about 30 days later. Removal of an injured eye prior to inflammation in the sympathizing eye will prevent its occurrence. Cause of sympathizing inflammation is not definitely established but is presumed due to autosensitivity to some ocular tissue, probably uveal pigment.

Unless an eye is injured beyond repair, immediate repair of the injured eyeball followed by close observation for a ten-day period is advisable. If the eye is blind and soft after ten days and shows evidence of increased inflammatory response, it should be removed immediately.—*Am. J. Surg. (Sept., 1959): 389.*

A Practical Method for the Decontamination of Microbiologic Laboratories by the Use of Formaldehyde Gas

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THE DECONTAMINATION of microbiologic laboratories is a difficult task. Many different methods, such as the use of live steam, ultraviolet light, liquid chemical disinfectants, and gases, have been tried with various degrees of success. Most methods of decontamination are limited in their applicability by such factors as the danger of explosion, damage to the laboratory and equipment, difficulty encountered with use, and efficiency and economy of the operation.

In the latter part of the nineteenth century, formaldehyde was found to be a promising disinfectant, because of its toxicity to microorganisms and its applicability in the form of a gas. Recognition of these factors served to increase further use of formaldehyde vapors for disinfection of rooms and closed spaces contaminated with infective agents, and particularly for decontamination of large incubators and poultry hatcheries.

The value of formaldehyde gas as a bactericidal and virucidal agent has been investigated by various workers. Working with *Salmonella pullorum* and *Pasteurella avicida*, three workers[2] found that formaldehyde gas could be satisfactorily used in the fumigation of the forced-air-type egg incubator. They also observed that the germicidal efficiency of formaldehyde gas was increased by a high relative humidity. When the amount of moisture was decreased, the germicidal efficiency of formaldehyde was decreased. Two methods were reported to be successful in destroying *S. pullorum*: (1) the use of 17.5 Gm. of potassium permanganate and 35 ml. of formalin for each 100 cu. ft. of incubator space, and (2) the formalized cheesecloth method (20 ml. formalin/100 cu. ft. of space).

In another report,[3] fowlpox virus in a 1.0 per cent aqueous suspension placed on cotton squares or on the feet and down of 1-day-old chicks was consistently inactivated when the virus was subjected to formaldehyde in amounts of 20 ml./100 cu. ft. of incubator space. Later, others[4] confirmed the value of formaldehyde by presenting experimental data in support of the germicide, as well as the virucide, efficiency of formaldehyde vapors for two strains of hemophilic bacteria, two strains of avian laryngotracheitis virus, and one strain of avian bronchitis virus.

When Newcastle disease virus (NDV) was placed on cotton pledgets, it was destroyed by 70 ml. of formalin per 100 cu. ft. of space.[1] A field test on hatchery fumigation was conducted in an effort to kill NDV by the use of formaldehyde gas.[6] Combining formaldehyde gas with high humidity, these workers succeeded in inactivating virus that had been placed on cotton pledgets and eggshells in various areas of the incubator.

A search of the literature concerning the use of formaldehyde vapor for the disinfection of laboratories revealed no information as to the virucidal activity of this gas under controlled laboratory conditions. Thus, this paper will present data on the use of formaldehyde gas and high humidity in the fumigation of two virus laboratories.

MATERIALS AND METHODS

One of the laboratories was the Newcastle disease building, which is a secure, air-sealed isolation unit designed exclusively for work with Newcastle disease virus. It contains approximately 20,000 cu. ft. of space, which is divided into six bird-isolation and laboratory rooms. The building has an air-conditioning and ventilation system which circulates the air through metal ducts in a pattern which prevents contamination from one room to another.

The other laboratory was the vesicular diseases laboratory. This building has the conventional window-type ventilation, contains approximately 34,000 cu. ft. of space, and consists of several separate laboratory rooms. Before the initiation of fumigation procedures, all windows and other

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openings were securely closed and then sealed with wide strips of masking tape.

Fumigation of these buildings was carried out in the following manner: vessels containing multiple amounts of formalin, at the rate of 35 ml. of formalin (formaldehyde solution, U.S.P., 37% by weight, 40% by volume) for each 100 cu ft. of space, were placed in several areas throughout the building. The vessels used were about ten times larger than the amount of material in them to allow for the rather violent reaction which takes place when potassium permanganate is added to formalin. Potassium permanganate was weighed in the proportion of 17.5 Gm./100 cu. ft. of space, and receptacles containing multiple amounts, which corresponded to the amounts of formalin, were placed by the side of the vessels containing formalin. Humidity throughout the buildings was increased to 100 per cent by turning on the autoclave pipe and all hot water faucets and allowing the steam to disseminate. The temperature rose to over 100 F. According to a prearranged plan, the potassium permanganate was added to the formalin beginning with the vessels located in the back part of the building and working quickly toward the front door. In the Newcastle disease building, potassium permanganate was then added to the formalin which had been placed in the intake air ducts located in an outside boiler room. The exhaust air ducts were left open during fumigation, but the exhaust fans were turned off after 15 minutes. All outside doors of both the Newcastle disease building and the vesicular diseases laboratory were then taped with masking tape on the outside, and the buildings left closed for 65 hours. The temperatures inside the buildings did not fall below 70 F. at any time during this period.

To obtain data on the effectiveness of the fumigation process, several samples containing infective agents were located throughout the laboratories. The GB-Texas strain of NDV was used in the Newcastle disease laboratory. This is a standard laboratory strain obtained from the Wisconsin Virus Repository, Madison, Wis. After the virus had been passaged twice through 10- to 11-day-old embryonating chicken eggs, the amnioallantoic fluid was collected and used for the preparation of the various dilutions of NDV. The e.l.d.$_{50}$ of the virus for 10-day-old embryonating chicken eggs was calculated by the method of Reed and Muench[6] and found to be $10^{-9.5}$.

The New Jersey Concan strain of the vesicular stomatitis virus (VSV) representing the fifth chicken embryo passage was prepared by macerating one part of chorioallantoic membranes with four parts of infective allantoic fluid harvested from dead chicken embryos, and it was employed as a test viral agent in the vesicular diseases laboratory. The e.l.d.$_{50}$ of the virus suspension was determined in 8-day-old embryonating chicken eggs, and the value computed according to the method of Reed and Muench. It was found to be $10^{-9.38}$.

Newcastle disease virus and VSV were prepared as 10^3 dilutions in nutrient broth, and each was distributed separately into three sets of Petri dishes in the following amounts: 0.5, 1.0, 2.0, 5.0, and 10.0 ml. In each of the laboratories, one set of Petri dishes containing the above-mentioned amounts of virus was left uncovered and placed on work tables where formaldehyde gas was freely accessible. The second set of Petri dishes containing similar amounts of virus was covered and placed in a container, which was then sealed with tape and placed on a work table. In this way, the virus inside the container was subjected only to the effect of the room temperature. The third set of Petri dishes containing similar amounts of virus was covered, placed in a container, and kept in the refrigerator as a control set.

After the buildings were opened, the material remaining in uncovered dishes, which were exposed to fumigation on laboratory work tables, was reconstituted with 1 ml. of broth. Then 0.1 ml. of the NDV material was inoculated into the allantoic cavity of each of six 10-day-old embryonating chicken eggs, and 0.15 ml. of the VSV material, into the allantoic cavity of five 8-day-old embryonating chicken eggs. To confirm the presence of viable virus, the amnioallantoic fluid from all eggs in which the embryo had died was tested by the hemagglutination (HA) test for NDV and by the complement-fixation (CF) test for VSV.

Four identical series of tenfold dilutions (10^1 through 10^9) of each of the viruses were made with nutrient broth; 4.5 ml. of each dilution was placed in 20-ml. sterile glass tubes. One series of tubes was left unstoppered, another had cotton plugs, and the third and the fourth series had rubber stoppers. The first three series of tubes were left on work tables; the fourth series was held in the refrigerator as controls. Shortly after the buildings were opened, all serial dilutions, including

TABLE I—Effect of Exposure of Various Amounts of Newcastle Disease Virus and Vesicular Stomatitis Virus to Formaldehyde Gas and High Humidity in Petri Dishes for 65 Hours

Amount of inoculated virus material (ml.)	Embryo mortality (dead/no. inoculated)					
	Newcastle disease virus			Vesicular stomatitis virus		
	Exposure in Petri dishes			Exposure in Petri dishes		
	Uncovered	Sealed	Controls	Uncovered	Sealed	Controls
0.5	1/6*	6/6	6/6	0/5	1/5	5/5
1.0	2/6*	6/6	6/6	0/5	1/5	5/5
2.0	0/6	6/6	6/6	1/5**	4/5	5/5
5.0	0/6	6/6	6/6	0/5	5/5	5/5
10.0	0/6	6/6	6/6	0/5	5/5	5/5

*Negative hemagglutination; **negative complement fixation; all others positive.

control tubes, were checked for the presence of viable virus by the technique previously mentioned; *i.e.*, injection of embryos and harvesting and testing of amnioallantoic fluid by HA or CF tests.

Other agents which were subjected to the action of formaldehyde gas and high humidity in the vesicular diseases laboratory were *Erysipelothrix rhusiopathiae*, strain S-192, and a mixed culture of bacteria and mold isolated from grass. These cultures were fresh transfers made the day preceding the exposure run. Open and closed nutrient agar plates of these cultures were placed with the other samples on laboratory work tables. A parallel set of plates was kept as control agar plates at room temperature in a laboratory located in another building. After fumigation, all bacterial samples were subcultured on serum or nutrient broth and incubated at 37 C. for several days. If no growth occurred, the sample was considered sterile.

The effectiveness of formaldehyde in destroying air-borne contaminants was tested in the vesicular diseases laboratory. Prior to fumigation, three agar plates were left open for two hours and then incubated. An average of 12 colonies per plate was observed. These plates, together with three sterile agar plates, were left open on work tables during the fumigation process. Immediately after fumigation was completed and the building was opened, three additional sterile agar plates were placed on work tables and allowed to remain open for two hours. These plates, together with the plates which had been open during the fumigation process, were then incubated.

RESULTS

The embryo mortality pattern was obtained by injecting eight 10-day-old chicken embryos with 10^3 broth dilutions of viral agents which had been placed in Petri dishes and exposed to formaldehyde gas and high humidity. (table 1). Amnioallantoic fluid harvested from eggs that died was tested for the presence of viable virus by the HA test for NDV and the CF test for VSV. As a result of these tests, it was found that formaldehyde gas combined with high humidity was effective in inactivating all amounts of the agents exposed in open Petri dishes. However, the viral agents in Petri dishes which were placed in sealed containers were not inactivated.

The cultures of *Ery. rhusiopathiae*, strain S-192, which were included in the test were inactivated in both open and closed (not sealed) Petri dishes. A control culture maintained under refrigeration in the laboratory remained viable.

The mixed culture of bacteria and mold isolated from grass was inactivated when exposed in open Petri dishes, but remained viable when the Petri dishes were sealed and left on work tables. Controls kept under refrigeration also remained viable.

TABLE 2—Decrease of Titers upon Exposure of Newcastle Disease Virus and Vesicular Stomatitis Virus to Formaldehyde Gas and High Humidity in Glass Tubes for 65 Hours

	Newcastle disease virus		Vesicular stomatitis virus	
Tubes	Titer	Decrease in titer in logs	Titer	Decrease in titer in logs
Open	$10^{-6.5}$	2.0	$10^{-4.5}$	4.66
Cotton-plugged	$10^{-6.5}$	2.0	$10^{-4.5}$	4.66
Rubber-stoppered	$10^{-8.0}$	0.5	$10^{-5.68}$	3.48
Controls	$10^{-8.5}$	0	$10^{-9.16}$	0

The results of exposing 4.5-ml. log dilutions of NDV and VSV in tubes with various types of stoppers to the fumigation procedures are shown (table 2). Tubes with rubber stoppers, which were kept in the refrigerator as controls, showed no decrease in titer for either virus. However, tubes closed with rubber stoppers and left on the work tables did show some loss of titer. In the case of each of the viruses, the decrease in titer of cotton-plugged tubes was the same as that of the open tubes, but more than that of the rubber-stoppered tubes.

The agar plates, containing approximately 12 colonies per plate of air-borne contaminants which were left open on work tables, showed no further growth upon incubation, and the sterile agar plates which were also left open during fumigation also showed no growth on subsequent incubation. The agar plates which were exposed for a two-hour period immediately after the building was opened showed an average of three colonies per plate of air-borne contamination when incubated.

DISCUSSION

Several factors are essential for successful fumigation with formaldehyde gas. The space to be fumigated must be tightly sealed to prevent loss of the gas. The gas, which is in solution in water, must be rapidly liberated from its association with water. However, it must then combine with moisture in the air in order to be effective. The higher the humidity, the more effective is the fumigation. The temperature within the space being fumigated should never fall below 65 F. during the fumigation process. If the temperature is higher, the fumigation is more efficient.

The Newcastle disease building was easy to seal because it is constructed with double glass air-tight windows, and masking tape had to be used to seal only the doors. Both buildings proved to be well sealed as little leakage of gas could be detected when all openings were inspected.

When the buildings were opened on Monday morning, the concentration of gas within them was still sufficient to be irritating to the eyes, nostrils, and lungs. The relative humidity was still high (85% wet bulb reading), and the buildings were warm. However, when the fans were turned on, the buildings were quickly cleared of gas and workers were comfortable within a half hour. The most noticeable damages to the laboratories were removal of paint by the masking tape, spots left on the walls and ceilings by condensation, and damp books, papers, etc.

The efficiency of formaldehyde gas fumigation against surface contamination was amply demonstrated by the inactivation of the viruses, bacteria, and molds which were exposed in the open Petri dishes. It was shown, too, by the decrease in the number of air-borne bacteria after the completion of fumigation, that the gas had been successful in reaching such relatively inaccessible areas as the air ducts. However, since this is a method of gas decontamination without pressure, virus in test tubes containing 4.5 ml. of broth was not completely inactivated because gas could not penetrate this depth of material.

It is interesting that the effect of the heat alone in the laboratory was much greater on the vesicular stomatitis virus than on the Newcastle disease virus as shown by the tubes with rubber stoppers, which were impermeable to gas (table 2). If the decrease in titer of the rubber-stoppered tubes (due only to heat) is subtracted from the decrease in titer of the open tubes (due to a combination of heat and formaldehyde gas), the effect of the gas alone was approximately the same for both viruses. This partial inactivation of the two viruses indicated that, although gas was taken up by the suspending medium, it was not mixed with the medium in a concentration that was sufficient to completely inactivate the viruses. It appeared to make no difference whether the tubes were left open or had cotton stoppers as to the amount of the gas which entered them.

There is much work that could be done to determine the exact role that humidity, concentration of gas, temperature, and time play in the effectiveness of fumigation with formaldehyde. In our procedures, we used great safety margins. For instance, the length of time (65 hours) employed was from quitting time on Friday to opening time on Monday, and the results may have been as good if a shorter time span had been used.

SUMMARY

Formaldehyde gas combined with a high percentage of humidity was shown to be an economical and efficient method of fumigation for a laboratory where surface decontamination is of primary importance.

Various amounts of 10^3 dilutions of Newcastle disease virus and vesicular stomatitis virus, cultures of *Erysipelothrix rhusiopathiae*, a mixed culture of bacteria and mold isolated from grass, and cultures of air-borne contaminants were all completely inactivated when exposed to the fumigation procedures in open Petri dishes.

When various dilutions of the viruses were exposed to the gas in open tubes or tubes closed with cotton plugs, the titers of both viruses decreased, but the viruses were not completely inactivated because gas was unable to penetrate the depth of the suspending medium.

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Sleeping Sickness

Equine encephalomyelitis has been reported in six counties in the southern part of New Jersey: Ocean, Atlantic, Cape May, Cumberland, Burlington, and Monmouth. Not many cases have been confirmed, either in New Jersey or elsewhere, but reports of infected horses have been made in Maryland, Delaware, Pennsylvania, North Carolina, South Carolina, Georgia, Florida, and Louisiana. The eastern type of the virus usually results in death for more than two thirds of its equine victims. The virus has been responsible for the death of at least 18 persons who were residents of, or recent visitors to, south New Jersey.

West Virginia authorities have prohibited the entry of horses and mules from New Jersey, and the Thoroughbred Breeders Association of New Jersey has announced indefinite postponement of the yearling sale which was to have been held October 9.

The New York State Racing Commission on September 30 issued an order requiring that horses sent from New York must be accompanied by certificates of vaccinations against encephalomyelitis within the past year and must be submitted to veterinary examination upon arrival. The order required the fumigation of vehicles carrying horses and of stalls occupied by horses arrived within the past 30 days from New Jersey, and specified that all such horses, unless they already have certificates of good health, must be examined immediately.

On October 6, the Department of Agriculture and Markets issued from Albany an order extending protective measures to the extent of requiring health certificates and vaccination records for horses entering New York from any other state. The order also calls for the fumigation of horse vans after each shipment into the state.—*Blood-Horse, 78, (Oct. 10, 1959): 830.*

Milking Equipment May Spread Leptospirosis

A typical mastitis caused by *Leptospira pomona* is characterized by a febrile reaction so transient that it may pass unnoticed in many cases. Relatively few animals so affected will abort because most are either not bred or are in the early months of gestation when Leptospira-caused abortion is less common. Recovery is usually complete, although a secondary mastitis due to other bacteria may occur. Individual milk yield often does not return to pre-infection levels.

Negative serologic findings during the first week after appearance of clinical signs should not lead to a negative diagnosis because later tests may prove positive.

A single parenteral injection of penicillin and streptomycin was shown to have no value in preventing the shed of leptospires in urine. A single intramammary infusion also proved ineffective. Early antibiotic therapy did not appear to clinically affect the course of the disease. There was some evidence to suggest that early antibiotic therapy may be detrimental because of its tendency to inhibit antibody response by limiting subsequent generalization and localization of infection in the kidneys.

Normal milk has a marked antileptospiral effect which would preclude the possibility of leptospires surviving in bulk milk supplies long enough to constitute a public health hazard. However, the chance of animal-to-animal spread of the disease via contaminated milking equipment is possible. The danger in handling and feeding milk from affected cows should be pointed out to dairymen, and they should be urged to discard such milk. It is doubtful if leptospires will be shed in the milk of affected animals for longer than three or four days.

Leptospira pomona organisms were isolated from the milk of 2 cows in one of the herds investigated in this survey.—*D. Mitchell, P. Boulanger in Canad. J. Comp. Med. & Vet. Sci, 23, (Aug., 1959): 250.*

Surgery and Obstetrics
and Problems of Breeding

Canine Esophageal Achalasia Corrected by Retrograde Dilatation—A Case Report

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CANINE ESOPHAGEAL achalasia with megaesophagus has been reported with increasing frequency,[4,6,8] with both surgical[4] and mechanical treatment[8] described. This case is reported, because of a factor complicating the diagnosis and the corrective approach applied.

Achalasia, or cardiospasm, is a result of failure of the terminal esophageal wall to relax after swallowing.[2,3] Ingested material and saliva accumulate with dilatation of the esophagus cranial to the sphincter. It is reported[4] to occur in dogs of larger breeds, but in the present instance, a small breed was represented.

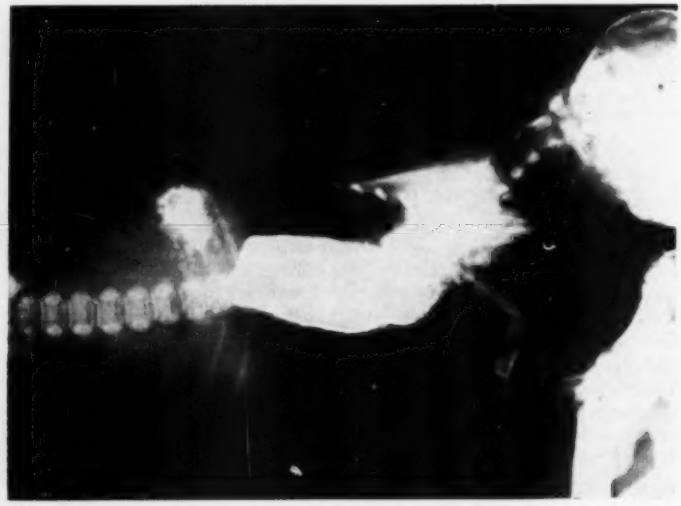

Fig. 1—Radiograph of a dog taken 15 minutes after administration of barium, showing dilated esophagus with terminal constriction at the diaphragm.

CASE REPORT

A male Miniature Schnauzer was treated with piperazine citrate for roundworm infestation at weaning and was sold after a single treatment. The smallest of a litter of 4, it seemed normal to the owner up to the time of sale. Two days after being sold, it was examined because of signs of discomfort and severe vomiting. At least 5 adult ascarids had been passed following worming. Treatment with laxatives resulted in the passage of more worms, and piperazine citrate given ten days later yielded more until a total of 14 ascarids were removed from the 2-lb. dog.

Vomiting continued despite treatment with smooth muscle relaxants and fluid therapy. From one-half to ten hours elapsed between eating and the vomiting of semisolid, undigested food mixed with saliva. Vomiting occurred one to three times daily. After five days of unsuccessful treatment, 40 cc. of barium sulfate was given orally and radiographs taken. One, taken 15 minutes after administration of barium, showed a grossly dilated esophagus with terminal constriction at the diaphragm (fig. 1). A diagnosis of esophageal achalasia with megaesophagus was made.

Because of the size and rapidly failing condition of the dog and the degree of

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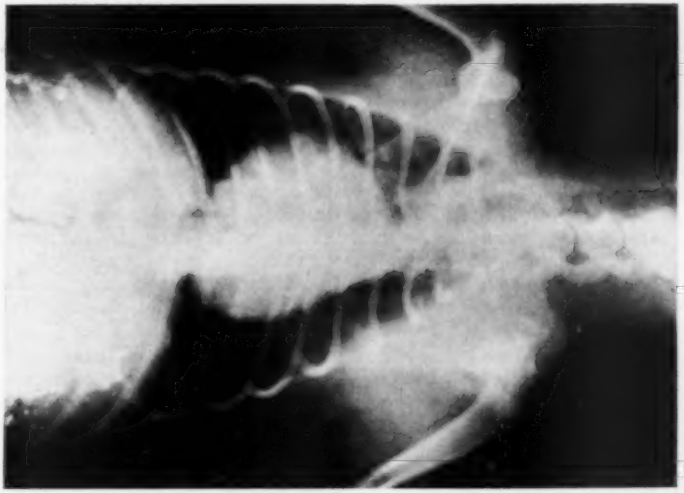

Fig. 2—Radiograph of the same dog shown in figure 1, taken four months after surgery. Barium sulfate was administered three minutes before radiograph was taken.

dilatation of the esophagus, euthanasia was recommended. However, the owner, a physician and co-author of this report, requested that corrective surgery be attempted.

SURGICAL PROCEDURE

Under morphine sedation and xylocaine hydrochloride local anesthesia, a ventral midline incision was made, but it was inadequate to permit diaphragmatic examination. Therefore, the stomach wall was incised along the greater curvature and uterine dilators, used in man were inserted through the cardiac sphincter in increasing sizes. Only slight resistance to dilatation was felt at this time. The stomach and abdominal walls were sutured in the usual manner. Postoperative treatment included antibiotics, prednisone, and antiserum. Belladonna and phenobarbital elixir were given before every meal.

Vomiting occurred at infrequent intervals for two weeks after surgery. Radiographs (fig. 2) taken four months later showed apparently normal structures. No vomition had occurred for three months, and the dog had outgrown and outweighed its littermate.

DISCUSSION AND SUMMARY

Canine esophageal achalasia with megaesophagus was complicated by ascarid infestation. The corrective surgery involving gastrotomy and dilatation of the cardiac sphincter, originally proposed as an alternate to extramucosal myotomy at the site of the sphincter, was simple and apparently successful. The size of the dog and its rapidly failing condition would seem to preclude mechanical dilatation with bougienage as described by Stack.[8]

The intragastric approach to dilatation employed is feasible in any dog considered a good surgical risk, and may be preferable to thoracic surgery, especially in smaller dogs.

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Examination of Aberdeen Angus Bulls for Breeding Soundness with Comments on Pathology

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EXAMINATION of bulls for breeding soundness is assuming an increasingly important place in cattle practice. As quality and value of beef cattle increase and as cattle owners become more cognizant of the merits of this examination, veterinarians engaged in cattle practice will be expected to conduct proficient examinations.

The following discussion deals with my personal experience and observations over a three-year period at a large Aberdeen Angus ranch located in LeFlore County, Oklahoma. The cow herd consisted of approximately 1,000 purebred females and a like number of commercial females. The bull battery consisted of 10 valuable bulls of various ages and conditions. The purebred produce was represented by sale bulls and replacement heifers. The commercial produce consisted of feeder steers and replacement heifers. Artificial insemination, employing frozen semen exclusively, was practiced extensively in both herds.

Sale bulls, with which this paper is concerned, were weaned and halter broken at 7 months of age, after which they were maintained in groups of 25 to 50 in small pastures. Adequate exercise and good condition were assured. Their ration consisted of corn ensilage and a vitamin-mineral supplement plus adequate hay and grass. Bulls were sold at approximately 18 months of age by private treaty and auction. The top 20 per cent went to other purebred herds, and the remaining 80 per cent were sold to commercial breeders.

PHYSICAL EXAMINATION

At the Kermac Angus Ranch, bulls are examined for breeding soundness immediately before sale. They are loosely restrained in a squeeze chute to minimize excitement; heads are not restrained. A horizontal bar is placed immediately behind the animal just above the hocks to minimize danger from kicking.

The physical examination of the reproductive tract is conducted as follows:

1) Kneeling behind the bull (sideways for one's own protection), the scrotum is examined for pliability, temperature, edema, lacerations, tumors, dermatitis, or other obvious abnormalities. Excessive scrotal fat can insulate the testicles and result in serious infertility. The normal scrotum should be cool to the touch and pliable. The relative temperature of the scrotum is most readily perceived when the back of the hand or the wrist is applied to the scrotum's most distal portion. An apparent allergic scrotal edema in yearling bulls is the most common scrotal disease encountered in our herd. With treatment it has subsided in 24 to 72 hours with no apparent effect upon fertility. It should be recognized as a potentially serious condition, since continued presence of edema can cause testicular degeneration through its insulating effects.

2) The testicles are palpated. They should be of approximately equal size and move freely within the scrotum. Their consistency should be rather firm and bulging, not soft or hard. Experience will more fully acquaint one with the normal character of these organs. Acute orchitis is characterized by heat, swelling, pain, and altered gait. Chronic orchitis is characterized by either crepitation and excessive softness when the testicle is a mass of pus, or excessive firmness when scar tissue is predominant. Chronic orchitis is further characterized by the presence of adhesions between the testicle and scrotum, and often a decrease in size of the testicle. Testicular hypoplasia is occasionally seen, the testicles being small and underdeveloped with lifeless consistency.

3) The epididymis of each testicle is palpated. It should be approximately equal in

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This paper will appear simultaneously in the JOURNAL and in the "Journal of the Society for Study of Breeding Soundness in Bulls."

size on each side and possess a rather firm, lively consistency. The head and tail are readily palpable, but the body is usually indistinguishable in the normal subject. Abnormalities commonly seen are absence or hypoplasia of one or both; the corresponding vas deferens and seminal vesicle usually are affected similarly. Absence or hypoplasia of one epididymis does not usually affect fertility, but due to its possible heritability the animal should not be used in a purebred herd. Epididymitis occurs alone and in conjunction with orchitis. The physical changes in the epididymis are similar to those seen in a testicle affected with orchitis.

4) The vasa deferentia are palpated in their course on either side of the median septum of the scrotum. In my experience, they rarely have been involved in reproductive disorders.

5) The sheath is examined. Abscesses of rudimentary teats at the junction between the sheath and scrotum are occasionally seen but are of little significance as they usually rupture externally and heal readily.

6) The penis is examined by palpating through the sheath. A more thorough examination of the penis and prepuce is possible when semen is collected and the penis is extruded. It is examined for warts, tumors, and inflammation. Adhesions between the penis and prepuce are occasionally seen. Some result from injury, but most of those in virgin bulls are considered physiopathologic, due to the persisting prepubertal adhesion between the penis and prepuce. This adhesion will prevent complete extension of the penis. Some Angus bulls have a penis that is abnormally long, which tends to allow the penis to prolapse and subjects it to injury. Small heifers often suffer injury as a result of coitus with these animals. Conversely, some bulls have an underdeveloped penis. The only way to salvage such a bull is by utilizing an artificial insemination program, but slaughter is indicated since the condition may be heritable.

7) A rectal examination is indispensable. The ampullae of the vasa deferentia should be palpated, followed by palpation of the seminal vesicles. The seminal vesicles are lobulated glands located on either side of the neck of the urinary bladder. They are approximately equal in size in the normal subject and have a rather firm consistency. Seminovesiculitis is a common finding and is characterized in the acute stages by swelling, heat, and sometimes pain. Chronic seminovesiculitis is characterized by a hard nonyeilding seminal vesicle that is often adhered to the surrounding tissue. Pus is consistently observed in the semen either grossly or in the stained semen smear. Response to treatment is poor.

SEMEN COLLECTION

Semen is collected by one of the following methods: (1) massage of the seminal vesicles and ampullae of the vasa deferentia; (2) electroejaculation; (3) by use of the artificial vagina.

I prefer massage of the seminal vesicles and ampullae and, contrary to what is usually published in veterinary literature, results have been good. Many excellent ejaculums have been collected. It is obvious that this technique offers several advantages over the electroejaculator and artificial vagina.

As the hand is already in the rectum examining the intra pelvic structures, it is a simple matter to proceed, massaging first the seminal vesicles, then stripping the ampullae. An observant assistant with a warm funnel and tube collects the semen after the initial flow of seminal fluid has flushed the urethra.

About 75 per cent of the bulls examined responded well to this technique, the great majority of them extending their penis and ejaculating good semen. Frozen massaged semen has compared well with frozen semen collected by the artificial vagina in our breeding program.

Bulls failing to respond to the massage technique are subjected to electroejaculation, care being exercised to use the minimum stimulation required. It is rare that an artificial vagina is required for collection of semen. Those bulls that fail to respond to any of the collection methods are re-examined at a later date. If repeated attempts at collection fail, the bull is bred naturally to virgin heifers for the supreme test of fertility.

SEMEN EXAMINATION

After collection, semen is examined immediately in a warm environment. Concentration is estimated by gross examination; volume and color are recorded, and motility is determined by microscopic examination under low power. The percentage of motile spermatozoa and the degree of motility are

estimated. Degree of motility is recorded as 1, 2, 3, or 4 with appropriate +'s and −'s. These figures correspond to poor, fair, good, and excellent. Bulls ejaculating semen containing fewer than 70 per cent viable spermatozoa are re-examined.

A microscope slide is next prepared, employing a small drop of semen and a drop of warm saline solution if dilution is necessary. The semen is spread in a thin film utilizing the technique used in preparation of blood smears. By adjusting the mirror on the microscope, one may observe morphology without benefit of a stain solution. Eosin is occasionally used for staining, but it is felt that there is less distortion of the cells when slides are prepared with semen alone. The percentage of abnormal forms are recorded after counting 100 spermatozoa from various areas of the slide. Principle abnormalities are listed. Abnormalities of the head are much more serious than those of the middlepiece or tail. The most common abnormalities observed involve the middlepiece and tail, and they are usually due to cold shock, chemical contamination, or the presence of urine in the ejaculum. Bulls are re-examined if the number of abnormal forms exceed 30 per cent.

A small portion of semen is poured over a slide and examined grossly for small clumps of pus. If warranted, a smear is prepared with Wright's stain and examined for pus cells. Grossly, agglutinated spermatozoa resemble clumps of pus, so that microscopic differentiation is necessary. It is easily effected by examining the stained smear. Pus cells appear in semen whenever any portion of the reproductive tract is inflamed. The site of inflammation can usually be determined by careful physical examination. Inflammatory processes of the urinary system should be considered as a possible source of pus in semen.

Tests for brucellosis and tuberculosis complete the examination.

RESULTS

Bulls that pass the initial examination are offered for sale; those that are hopelessly infertile are slaughtered. Those that suffer from conditions that warrant treatment are treated and re-examined. Those that fail the initial examination for reasons not obvious are never called infertile, but are re-examined at weekly intervals. Many pass subsequent examinations.

SUMMARY

Examination of bulls for breeding soundness is of increasing importance in cattle practice. As cattle owners become more aware of the merits of this examination, veterinarians engaged in cattle practice will be expected to conduct proficient examinations.

The paper deals with the author's experience and observation in a three-year period at a large Aberdeen Angus ranch located in LeFlore County, Oklahoma.

Factors in Fecundation

Apparently only spermatozoa with proper rheotaxic ability can propel themselves against the countercurrent of the uterus to reach the fallopian tubes. In the females, there is a difference between the function of the uterine cervices in the mare and cow. In the mare, the spasmodic occlusion of the cervix with contractions of the uterine wall contributes to the quick transportation of spermatozoa to the fallopian tubes. In the cow, the contractions of the vaginal wall during copulation force the spermatozoa to enter the cervical canal, and a succession of contractions of the uterine wall produce a suction effect on secretions which enter the cervix. If any of these factors are inadequate, sterility results.—*A. V. Das Neves e Castro in Anais Escola Superior Med. Vet., 1, (1958): 137.*

Tail Biting in Pigs

Since boredom is probably a factor in tail biting by confined pigs, two preventive measures are suggested: (1) Dock the tails the day the pigs are born; (2) place a few rounded rocks in the pen for the pigs to root when they become bored.—*Successful Farming (Aug., 1959): 6.*

Chronic Equine Abscesses Associated with *Corynebacterium pseudotuberculosis*

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IN RECENT YEARS, an enzootic occurrence of suppurative lesions in horses has been noticed by veterinarians in widely separated areas of California. The condition is sufficiently characteristic to be considered an entity by practitioners. It is also recognized by horsemen and has been variously designated by them as "false strangles," "false distemper," "breast-bone fever," "Wyoming strangles," "bastard strangles," and "pigeon fever."

In view of the increasing interest in this disease, a report presenting the current state of knowledge appears indicated.

CLINICAL FINDINGS

In most of the cases, the abscesses occur in the muscles of the pectoral area (fig. 1). Occasionally, they are found in the ventral abdominal region (fig. 2) from the umbilicus to the mammary gland, either as solitary lesions or, more commonly, in combination with pectoral abscesses. On one occasion, an abscess typical of this condition was encountered on the elbow of an animal that had previously shown a pectoral abscess. In a few instances, abscesses have developed on one side of the pectoral region to be followed in a few weeks with a similar lesion on the opposite side. In one case, an abscess was opened on the left pectoral region of a 1-month-old filly, and 34 days later it was necessary to treat a similar abscess in the right pectoral region.

The lesions develop slowly and insidiously. One of the first signs is a diffuse swelling of the affected area. The time required for the suppurative process to attain maximum development may vary from one to four weeks, but appears to be more rapid in abdominal locations where the lesions are more superficial. Ordinarily, the affected animal shows little discomfort. Temperature, pulse, and respiration remain within normal limits. The swelling may be sensitive to the touch, and an occasional animal will develop a temporary lameness.

It appears that the process begins deep in the muscles. As it progresses, the resulting swelling may remain localized, varying in diameter from 3 to 9 inches, or it may spread, as though by gravity, down a leg or along the ventral abdominal wall. Some of the abscesses starting in the pectoral region are accompanied by a boat-shaped swelling that may extend along the abdomen from the forelegs to the inguinal region (fig. 2).

Fig. 1—Pectoral abscess in a saddle horse, showing point of spontaneous rupture (arrow).

Inflammatory edema is the most prominent visible sign. The area over the abscess will feel slightly warm to the touch, depending on its depth. If left alone, the abscess may rupture spontaneously after a few weeks. The abscesses are single and develop in size slowly in comparison to the edema. Pus aspirated from an abscess is thick, viscid, and cream-colored. Direct microscopic examination shows leukocytes, predominantly neutrophils, at various stages of degeneration. Bacterial forms are not abundant enough to constitute a characteristic part of the microscopic picture. The only consistent hematologic change has been leukocytosis and a low grade neutro-

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The authors thank Dr. J. H. Woolsey of Santa Rosa, Calif., for submitting samples and providing clinical histories.

philia, with total counts varying from 14,000 to 23,000, consisting of 60 to 70 percent neutrophils.

ECOLOGICAL OBSERVATIONS

The condition described was first noticed on a large scale in 1956, and the incidence appears to have increased in the two succeeding years. Reports of practitioners in various sections of the state indicate that it occurs in all latitudes and is most frequently seen in the coastal and central valley regions. We have had no reports of its occurrence from the foothills and high country of the Sierra Nevada. In the past three years, the incidence has followed a fairly strict seasonal pattern with most cases occurring in late summer and fall. The first ones appear in August while few are seen later than mid-December. Records of the ambulatory clinic of the University of California in 1958 revealed 4 cases in September, 4 in October, 5 in November, and 1 in December. The last sample of pus received from a private practitioner for culture was collected December 30.

Fig. 2—Ventral abdominal swelling due to chronic abscesses.

The abscesses occur in horses of all ages and under a variety of management conditions. Most cases have been seen in Thoroughbred breeding establishments, but a number have been diagnosed in pleasure horses at widely scattered and isolated locations. In one area, 2 cases occurred on each of two breeding farms of 20 horses each, but at the same time sporadic abscesses in individual riding horses were occurring at remote points.

A pattern showing the sporadic distribution of the disease at a breeding establishment near Davis in 1958 is given (table 1). Abscesses occurred on this ranch in 1956 and 1958, but not in 1957.

BACTERIOLOGY

During the last two months of 1958, pus was collected from abscesses that had shown the clinical behavior outlined above. In all, eight samples were cultured, originating from three central valley counties (Solano, Yolo, Sacramento) and two coastal counties (Sonoma, Alameda).

Seven of the eight samples yielded a diphtheroid organism in pure culture while the remaining one, in addition to the diphtheroid, contained a Staphylococcus. The diphtheroid organism grew readily on the surface of beef blood agar forming white to ivory-colored glistening colonies with a wrinkled or sculptured surface. The colonies reached maximum size within 48 hours and were surrounded by a narrow zone of clear hemolysis. They were friable and could not easily be picked up with the inoculating loop. Flaming of a loop containing some of the growth resulted in a characteristic sizzling sound. The biochemical reactions of the eight strains are recorded along with those of a strain of *Corynebacterium pseudotuberculosis* obtained from the American Type Culture Collection and data supplied on the same species by five different sources (table 2). In addition, we have tabulated the reactions of a strain isolated concurrently from a case of ulcerative lymphangitis in a horse.

The first isolate was inoculated intraperitoneally into 2 male guinea pigs. One of these died within 24 hours while the other developed bilateral orchitis which became noticeable after three days and reached maximum development at the time of death, seven days after inoculation (fig. 3).

It is of interest that pure cultures were recovered with equal ease from aspirated pus obtained with sterile precautions from closed abscesses as well as from lesions that had opened spontaneously and were draining freely at the time of collection. It

TABLE 1—Distribution of Abscesses in Horses at Breeding Station

Number in isolated group	Classification	Number affected
12	Brood mares	1
4	Yearling fillies	3
2	Mare and foal	1 (foal)
2	Mare and foal	1 (mare)
8	Mares with foals	1 (foal)

should be emphasized that two abscesses on 1 horse yielded strains showing definite biochemical differences.

TREATMENT

Maturation of abscesses appears to be hastened by application of an ichthyol ointment and similar preparations. Once mature, the abscess should be incised and adequate drainage established. The cavity should be flushed with an antiseptic, such as dilute Lugol's solution, Nolvasan* solution, or Furacin** solution. This procedure usually brings about prompt recovery and has been adopted as the preferred treatment.

Administration of antibiotics before the abscess was ready for incision, in 2 of our cases, rather than aborting the suppurative process, merely prolonged the period before surgery could be performed. Antibiotic treatment in conjunction with and after drainage of the abscess, may be of benefit in hastening recovery.

DISCUSSION

One writer,[3] in a text on veterinary surgery, discusses shoulder abscesses in the horse as "almost peculiar to harness horses, always more or less deep-seated, and generally due to botryomycotic infection." While much of the clinical description is reminiscent of the condition reported in this paper, the nearly exclusive incidence in draft horses and the more dorsal and abaxial location of the shoulder abscess differentiate the two diseases without regard to etiology.

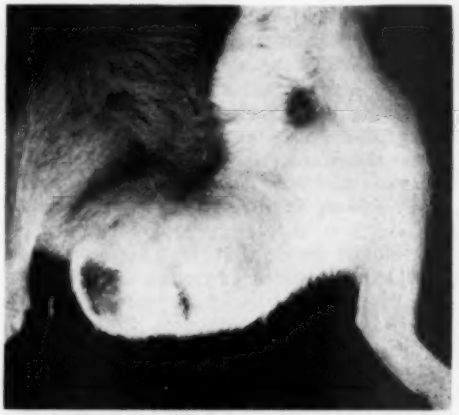

Fig. 3—Strauss reaction in guinea pig inoculated seven days previously with a strain of C. pseudotuberculosis isolated from an equine abscess.

The equine disease entity commonly ascribed to *C. pseudotuberculosis* is the classical ulcerative lymphangitis affecting the extremities and their draining lymph nodes. This condition is seen infrequently in the United States,[6] even in areas where ovine infection with this organism is common. In addition, another writer[5] described in a case report the postmortem findings in a clinically healthy mare whose visceral

*Nolvasan is produced by Imperial Chemical Industries, Ltd., England. **Furacin is produced by Eaton Laboratories, Norwich, N.Y.

TABLE 2—Cultural Reactions of Corynebacterium pseudotuberculosis and Strains Recovered from Equine Abscesses

	Bergey[a]	H&B[a]	T&W[a]	Carne[a]	Morse[a]	ATCC[a]	U.L.[b]	Abscesses[c]
Glucose	+	+	+	+	+	+	+	8/8
Lactose	+	−	±[d]	±	−	+w[e]	−	1/8
Sucrose	+	−	±	±	±	+	+	8/8
Maltose	+	+	+	+(−)[f]	±	+w	+	7/8[g]
Xylose	±	0[i]	0	0	±	+w	+w	6/8
Mannitol	0	0	±	±	0	−	−	0/8
Glycerol	0	0	+	+	0	−	−	2/8
Dextrin	+	−	+w	0	0	−	+w	1/8
Arabinose	0	0	0	−	0	−	+	6/8[h]
Mannose	+	0	0	0	0	+w	+	8/8[i]
Galactose	+	0	0	+	±	+	+	7/7[g]
Fructose	+	0	0	+	0	−	+	6/8[g]
Litmus milk	n.c.[j]	0	0	0	n.c.	n.c.	n.c.	0/8
Nitrate reduction	−	0	±	0	−(±)	+	+	8/8
Urease	0	0	0	0	+(−)	+w	+	3/8
Gelatin	−	0	+s[k]	0	0	+s	+s	8/8
Hemolysis	+	+	+	+	+	+	+	8/8

[a]Strain obtained from American Type Culture Collection, Washington, D.C.; [b]strain isolated from a case of ulcerative lymphangitis in a horse; [c]strains isolated from chronic abscesses; numerator indicates number of strains giving positive reaction, denominator shows number of strains tested.

[d]May or may not be positive; [e]+w = weakly positive; [f]() = occasional exception; [g]1 strain +w; [h]2 strains +w; [i]3 strains +w; [j]no change; [k]+s = digestion evident after several days' incubation at room temperature; [l]no data available.

[3] Hall, H.R.: Veterinary Surgery, ed. 6, Baltimore, William Wood & Co., 1949, p. 1000.

[5] Morse, E.V.: Case Report, Cornell Vet. 47:(Jan.) 1957.

[6] Schoening, H.W.: Diseases Due to Corynebacterium pseudotuberculosis, Ann. N.Y. Acad. Sci. 54:(Art. 3) 1951.

lymph nodes, as well as other organs including skeletal muscles, contained caseonecrotic lesions. While no cultural studies were made, the condition was diagnosed as "ulcerative lymphangitis" on the basis of histopathologic examination. Aside from these, the disease described in the present report is the only one in which the available evidence implicates *C. pseudotuberculosis* with a high degree of constancy. It may be significant that the geographic area in which the equine abscesses are most frequent is also that in which caseous lymphadenitis in sheep is common, while the Sierra foothill and mountain region appears to be relatively free from *C. pseudotuberculosis* infection in both species.

When we attempt to rationalize a route of infection compatible with the observations set forth, we enter the realm of pure conjecture. If skin wounds are the portal of entry, it is difficult to account for the deep location of the early lesion. If the organisms enter through the digestive or respiratory tract, and are spread via the blood stream, localization in the pectoral region must be explained. Assuming that the condition reported[5] was due to *C. pseudotuberculosis*, the possibility remains that in our cases intramuscular lesions in the pectoral and abdominal areas are the only visible manifestations of a generalized infection. Until some of these animals become available for postmortem examination, this question will remain unanswered.

It has been suggested that the abscesses are the result of intramuscular injections involving contaminated needles or inocula. This seems unlikely and it fails to account for the seasonal and geographic incidence, the increased frequency in recent years, the fact that the condition has occurred in patients of practitioners who do not use the pectoral site for intramuscular injection, and the lack of a history of injection of any kind in an infected animal. Even allowing for lack of frankness on the part of the client, it appears that at least an occasional case would have come to light incriminating this type of inoculation.

On one breeding farm where a series of cases occurred, the history of intramuscular injections could be ruled out with certainty.

The pattern of cases on breeding farms and at widely scattered locations tends to suggest that the disease is not highly communicable.

SUMMARY

An enzootic form of chronic abscesses occurring during the late summer and fall months in the coastal and central valley area of California has been described. Initial bacteriologic studies and the nature of the process, as well as epidemiologic considerations, incriminate *Corynebacterium pseudotuberculosis* as the causative agent.

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Avirulent Anthrax Vaccine

Avirulent anthrax vaccine, such as the type introduced into South Africa by Sterne, is prepared from strains of *Bacillus anthracis* which are incapable of producing capsule under any circumstances and unable to kill even the most susceptible animals unless inoculated in very large doses. They can produce as much toxin as a virulent strain, however, and can induce strong immunity when inoculated into animals as living spores. These anthrax strains are considered stable since they show no tendency to revert to virulence.

A single dose will provide strong immunity and the vaccine may be used in one form for all species of farm animals.

Although sheep have been shown to be fully immune in less than a week after vaccination, and that immunity lasts for as long as 14 months, generally accepted field use indicates that immunity should not be counted on in less than ten to 14 days and

that duration of immunity be considered as one year.

Horses may take as long as four to six weeks to become fully immune.

All species show a febrile response for several days after vaccination.

Dairy cattle may show a drop in milk yield following vaccination but they usually return to normal in a few days. Vaccination of pregnant sows should be avoided since abortion may occur.—*Vet. Rec., 71, (Sept. 19, 1959): 637.*

Parasympathetic Stimulants Aid Pony Intubation

To facilitate passage of a stomach tube or administration of a capsule to a pony, subcutaneous injection of pilocarpine, arecoline, lentin, or other parasympathetic stimulant is helpful. Secretions liberated by the salivary glands as a result of these drugs act as a lubricant and assist passage of the tube or capsule. In ponies that have been fasted, the same response may be elicited by offering a half ear of corn before attempting to pass the tube.—*P. E. Hoffman in Georgia Vet., 11, (Jan.-Feb., 1959): 15.*

Clinical Problems with Shetland Ponies

The Shetland pony is important in some veterinary practices and can be a challenging patient.

Chronic laminitis with ensuing overgrowth of hoofs is frequently seen. Good hoof care alleviates this condition and restores the animal to limited use.

Recurrent upward fixation of the patella in young ponies usually disappears spontaneously as the pony matures. Stubborn, persistent cases may be helped by severing the medial patellar ligament.

Fractures continue to be a problem but size and greater ease in realignment and immobilization make them more responsive to treatment in ponies than in horses. We have found six to 14 weeks necessary for healing.

Tetany has been observed in a number of mares near parturition or shortly after. They respond well to 50 to 100 cc. of multiple mineral mixtures given intravenously.

Intestinal indigestion is frequently encountered and those ponies that do not respond to more conservative treatment may be treated by laparotomy and relief of any intestinal obstruction by enterotomy or massage. Paracentesis and hemograms, with particular attention paid to hematocrit readings, will provide valuable information concerning the status of the pony with indigestion.—*Lester Johnson, D.V.M., Stillwater, Okla., at Conference for Veterinarians, A. & M. College of Texas, June, 1959.*

"Face" Fly New in United States

Invasion of sections of the United States by a new pest closely resembling the housefly but centering its attack principally on livestock has been reported from Vermont to Wisconsin and as far south as West Virginia this year, resulting in reduced weight gains of beef cattle and decreased production from dairy cows.

This new pest, *Musca autumnalis*, is commonly called the "face" fly in the United States. These flies seek shelter in buildings and other protected areas during cold weather. Thousands may hibernate together in recesses about windows or in attics. Although they are troublesome when they enter such situations, they are serious nuisances in the spring as they emerge and nest around windows or on sunny walls.

Both sexes hibernate in large numbers in buildings. The eggs are laid on tiny stalks over patches of cow manure. The yellow larvae, when mature, move into soil to pupate. Adults are active from early spring to late autumn, but the number of generations is not known.

Adult flies usually gather in large clusters on the faces of animals, especially around the eyes and nose. They suck available liquids and irritate the eyes, causing swelling and lacrimation. Nostrils, mouths, and other moist surfaces are also attractive to them. The adults seek fresh blood from wounds, scratches, or bites caused by other insects, but are unable to inflict such injuries.

Control of the insect is difficult because several residual insecticides, which would probably be effective, can not be used on lactating dairy cows or meat animals soon to be slaughtered. Frequent applications of repellents may protect the animals.—*Nat. Pest Control Assoc. News Release, Sept. 29, 1959.*

An Attempt to Immunize Lambs Against Pneumonia

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PREVIOUS REPORTS from this station[4-7,10] concerned the incidence of pneumonic lesions observed in lambs at slaughter and the infections found to be associated with the problem. This paper describes the negative results obtained in attempts to prevent it through the use of a vaccine or immunizing agent prepared from the infective agents recovered from lesions. These agents consisted of Pasteurella sp., pleuropneumonia-like organisms (PPLO), and a virus.

Pasteurella bacterin has been used extensively against so-called "hemorrhagic septicemia" in animals.[1-3,8,11] One writer[3] reported that cattle inoculated with an oil-adjuvant vaccine survived challenge with massive doses of a virulent strain of *Pasteurella multocida*; another[1] used formol-saponin vaccine against Pasteurella in field trials with encouraging results. A third writer[11] succeeded in producing a high level of immunity in cattle using formalized Pasteurella bacterin. However, another[9] failed to control pasteurellosis in sheep when Pasteurella-immune serum was used prophylactically or therapeutically.

MATERIALS AND METHODS

The vaccine was composed of equal quantities of preparations made from the three kinds of agents, Pasteurella, PPLO, and the virus. The species used, *Past. multocida* and Past. *hemolytica*, were grown for 24 hours on Bacto tryptose agar containing 5.0 per cent defibrinated bovine blood. After establishing the purity of the cultures, the organisms were collected by flooding the plates with 5 ml. of a 1.0 per cent formol-saline solution. The Pasteurella-formol-saline suspension was incubated at 37 C. for 24 hours and then a loopful of the suspension was plated on blood agar to check for sterility. The bacterin was adjusted to a standard barium sulfate turbidity tube No. 10, equivalent to 10 billion organisms per 1 ml., using 1.0 per cent formol-saline solution.

The PPLO organisms were propagated in phenol red maltose broth enriched with 2.0 per cent Difco serum fraction. After 48 hours' incubation, the cultures were streaked on PPLO agar plates to insure that growth had occurred. The broth cultures were treated with formol-saline solution to make 0.1 per cent suspensions, followed by incubation at 37 C. for 24 hours, and checked for sterility using both blood agar and PPLO agar plates. The $L.D._{50}$ of the living PPLO culture used was found to be $10^{-8.4}$ in chicken embryos using the yolk sac inoculation technique.

The virus product used was in the form of the supernatant portion of egg fluid centrifuged at 10,000 r.p.m. for five minutes, and treated with 1.0 per cent formol-saline solution to make the final concentration 0.1 per cent. The virus had been found to belong to the psittacosis-lymphogranuloma group.[7]

Before this material was used on the main group of lambs, it was checked for safety on 6 lambs 4 to 5 weeks old. Lambs 1 and 2 were inoculated intramuscularly with 3 ml. of a solution of uninfected egg fluid in 0.1 per cent formol-saline solution. Lambs 3, 4, 5, and 6 were inoculated intramuscularly with 3-ml. quantities of the combined vaccine. Their temperatures were recorded before and after inoculation for ten days.

Of 126 lambs vaccinated intramuscularly with 3.0 ml. when 3 to 5 weeks old, 72 were given a second treatment five weeks later. An additional 130 lambs in the same flock were left untreated as controls. All of these were examined at the time of slaughter for the presence of pneumonia lesions. Limited attempts were made to recover infective agents from some of the affected lungs.

The age of 3 to 5 weeks for administering the vaccine was chosen in the hope that by this time interference in the development of response to the vaccine by passive immunity received from their dams would be avoided. Furthermore, the condition did not appear to originate until after this age has been reached.

RESULTS

Detrimental effects from the injections were not apparent in the 6 lambs used in the preliminary trials. There was a slight amount of red hepatization of the apical and cardiac lobes of the lungs of 1 of the lambs given the egg fluid, but these lesions probably were unrelated to the infection.

The results of the slaughter inspections, including information obtained on lambs of unknown origin slaughtered on the same days, are presented (tables 1 and 2). No advantage in reducing the incidence of pneumonic lesions was obtained by the

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TABLE 1—Pneumonia Lesions in the Lungs of Vaccinated and Control Lambs Found at Slaughter

Slaughter date	Vaccinated Lambs			Twice vaccinated lambs			Controls		
	Total	Lesions (No.)	Lesions (%)	Total	Lesions (No.)	Lesions (%)	Total	Lesions (No.)	Lesions (%)
7/30/58	40	12	30.0	---	---	---	32	11	34.4
9/25/58	10	7	70.0	54	26	48.1	69	23	33.3
12/4/58	4	0	0	18	3	16.7	29	3	10.3
TOTALS	54	19	35.2	72	29	40.2	130	37	28.4

vaccinations. In fact, the incidence of lesions was higher in the treated animals, both those given one and two injections, than the controls.

The incidence of lesions in the combined lots from the experimental flock totaling 256 was lower than that in the lambs from other sources (33.2% vs. 54.9%). These figures are both within the ranges encountered previously,[4,10] but may indicate that better than usual management of the experimental flock helped to limit the incidence of lesions.

Lung lesions were obtained from 6 lambs, 4 vaccinated and 2 nonvaccinated controls, slaughtered on July 30. Attempts were made to recover infective agents using blood agar plates, PPLO broth, and instillation into the nasal cavities of mice. A Corynebacterium was obtained from 1 vaccinated lamb, staphylococci and streptococci from both controls and, in addition, a Pasteurella sp. from 1 of the controls. PPLO were recovered from the tissues from 1 vaccinated and 1 control lamb. All the lungs from the 30 mice used, 5 per each lamb, were free of lesions ten days after inoculation, and no inclusion bodies were detected using Macchiavello's stain.

TABLE 2—Pneumonia Lesions in the Lungs of Lambs from Experimental Flock and Unknown Sources

Slaughter date	Experimental flock			Unknown sources		
	Total	Lesions (No.)	Lesions (%)	Total	Lesions (No.)	Lesions (%)
7/30/58	72	23	31.9	---	---	---
9/25/58	133	56	42.1	54	41	75.9
12/4/58	51	6	11.7	150	71	47.3
Total	256	85	33.2	204	112	54.9

SUMMARY

Efforts to reduce the occurrence of pneumonic lesions by use of vaccines were unsuccessful. The agent used was a formalized product containing *Past. Multocida, Past. hemolytica*, PPLO, and a virus, each recovered from the affected lungs of lambs. Fifty-four lambs were vaccinated intramuscularly with 3-ml. doses when between 3 and 5 weeks of age. Another 72 lambs were similarly treated, and again five weeks later. When slaughtered, 35.2 and 40.2 per cent, respectively, of the lambs in these two groups were found to have affected lungs.

Of an additional 130 lambs in the control group, 28.4 per cent were affected. Among other lambs from commercial flocks that were available for checking on the same dates, 54.9 per cent of the 204 examined were affected.

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Tularemia Acquired from Aerosols

Initial infections with *Pasteurella tularensis* occurred in 62 laboratory workers who had been vaccinated against the disease; all recovered. The disease was believed to have been acquired by inhaling bacterial aerosols produced by laboratory procedures. The vaccinated patients tended to have lower maximal temperatures and shorter duration of fever and symptoms than did unvaccinated individuals with tularemia. The efficacy of tularemia vaccine has not been completely evaluated.—*What's New, 213, (Fall, 1959): 20.*

Antibiotics Effective Against Ornithosis

Screening studies of action of chemotherapeutic agents against ornithosis in chicken embryos show the following order of efficaciousness: tetracycline, oxytetracycline, erythromycin, chlortetracycline, penicillin, and chloramphenicol. Streptomycin, dihydrostreptomycin, neomycin, and magnamycin had no apparent efficacy. In studies with turkeys known to be infected with ornithosis, control birds receiving no drugs yielded virus from their spleens while those treated with oxytetracycline yielded no virus.—*Agradata, 3, (1959): 10.*

Suggestions for Poultry Practice

The veterinarian's office should be equipped to aid in the diagnosis of poultry diseases; he should be familiar with management problems of poultry husbandry. The feed representative in the area should be informed of the veterinarian's interest in poultry work.

Nutritional requirements of poultry should be learned and the feeding program of feed companies in the area should be familiar.

Feed should never be condemned as the cause of a poultry ailment without first notifying the feed representative. Neither should a deficiency disease be diagnosed without having a preponderance of evidence at hand.

Do not make diagnoses or perform necropsies without making a proper charge.

Periodic calls by feed representatives to flocks that they have under contract should be expected and not resented.

Flocks should not be medicated unless there is a specific reason for doing so and reasonable assurance that results will be profitable to the owner.

Flock owners should be discouraged from medicating their birds promiscuously.

Before recommending addition of large amounts of medicaments to feeds, contact the local feed representative.—*C. L. Nelson in Iowa Vet., 30, (July-Aug., 1959): 34.*

Bacterin, Penicillin Combat Erysipelas in Turkeys

Erysipelas in turkeys is transmitted mainly through injury to tissues, which result from fighting, drug injections, or rough insemination techniques. Two inoculations of erysipelas bacterin, properly spaced, are necessary to protect the birds. If an erysipelas epizootic occurs in a flock, penicillin injections are recommended.—*California Farmer, 211, (Sept. 26, 1959): 275.*

Digestive Disturbances of Cattle

The veterinarian's fund of information about digestive disturbances has been gradually increasing through discerning necropsies, careful physical examinations, and exploratory laparotomies. The recognition of the various distinct disturbances has become a science in itself. The manifestations of traumatic reticuloperitonitis, the more regular recognition of displacement of the abomasum, vagal paralysis, torsion of the abomasum, abomasal and omasal impaction, abomasal ulcers, and abomasal lymphomas, together with the clinical signs that result from disturbed rumen microorganisms, make it increasingly uncomfortable to use the term "rumen atony" as a final diagnosis.—*B. W. Kingrey at 1959 Annual Kansas State University Conference for Veterinarians at Manhattan.*

Ruelene, an Organic Phosphate, as an Anthelmintic in Sheep

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RECENT INVESTIGATIONS[1,2,4] have demonstrated that organic phosphorus compounds, as a group, are potentially valuable anthelmintics, particularly for ruminants, as well as being systemic insecticides for use on animals and plants. In general, the effective compounds of this group have shown a broader spectrum of anthelmintic activity than phenothiazine and require smaller quantities per treatment.

The most serious disadvantage of the organic phosphates as anthelmintics and systemic animal insecticides has been their unpredictable toxicity. Apparently this action is not consistently related to the size of the dose but is dependent on other factors which are not clearly understood at the present time.

Early in 1959 a new organic phosphorus compound, Ruelene,* was reported to have potential value as an anthelmintic and insecticide and to be less toxic than the effective drugs of this class which had been investigated previously. This compound is 4-tert-butyl-2-chlorophenyl methyl methylphosphoramidate; its structural formula is shown (fig. 1).

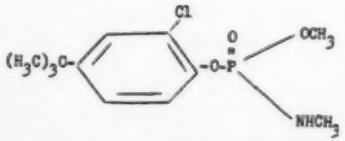

Fig. 1—The structural formula of Ruelene.

The purpose of this paper is to report the results of a preliminary trial with this compound as an anthelmintic in sheep in the hope that other investigators will undertake trials which will determine the utility and safety of this material under a variety of conditions.

PROCEDURE

The drug used in this trial was designated Ruelene, formulation M-1261 and was a wettable powder containing 25 per cent of the active material.

Twenty lambs, about 3 months old, which had been raised on pure Ladino clover pastures, were placed in a corral and fed alfalfa hay. On the basis of five fecal egg counts over a period of 13 days, they were assigned to two groups of 7 lambs each and one group of 6. Both average fecal egg counts of the groups and the range of distribution of egg counts within the groups were similar.

On the day of treatment, the lambs were weighed individually and treated as follows:

Group 1 (7 lambs)—100 mg./kg. body weight.
Group 2 (7 lambs)—200 mg./kg. body weight.
Group 3 (6 lambs)—no treatment.

The drug was given as a drench containing 1 Gm. of the active ingredient to each fluid ounce of water.

The weight of the lambs ranged from 17.2 to 31.4 kg. with an average of 24 kg.

Fecal egg counts were made daily following treatment. On the fourth day after treatment, the lambs were killed and all worms were collected separately from the abomasums and small intestines. The worms were counted using a dilution technique, and representative samples were identified in order to determine the number of each species present.[3]

RESULTS

The effect of treatment on the fecal egg count is shown (table 1). The numbers given in this table represent the average of all fecal egg counts made before and after treatment.

The average number of worms collected per lamb and the calculated anthelmintic

From the University of California, School of Veterinary Medicine.

This work was supported in part by grants from the Dow Chemical Co., Midland, Mich., and was conducted as part of a contributing project of Western Regional Research Project (W-35), "Nematode Parasites of Ruminants," supported in part by regional funds of the U. S. Department of Agriculture.

*Ruelene is a trademark product of the Dow Chemical Co., Midland, Mich.

TABLE 1—The Effect of Treatment on Fecal Egg Counts*

	Group 1 (100 mg./kg.)	Group 2 (200 mg./kg.)	Group 3 (control)
Pretreatment	2,433	2,239	2,802
Post-treatment	1,282	249	4,771
Percentage change	−47	−89	+70

*Eggs per gram.

efficiency as compared with the untreated group is shown (table 2). Statistical analysis of the differences observed in the average worm counts revealed that the differences between the two treated groups, and between the treated groups and control group were highly significant ($P=<0.01$). The differences in efficiency of the drug between the abomasum and small intestine of the 100-mg./kg. group were also highly significant ($P=<0.005$), but in the 200 mg./kg. group the small difference could have been a coincidence ($P=>0.20$).

TABLE 2—Average Total Worm Counts and Anthelmintic Efficiency of Treatment

	Abomasum		Small intestine		Total	
Group	Worm count (Av.)	Efficiency (%)	Worm count (Av.)	Efficiency (%)	Worm count (Av.)	Efficiency (%)
1 (100 mg./kg.)	5,746	51	3,518	64	9,264	57
2 (200 mg./kg.)	950	92	505	95	1,455	93
3 (Control)	11,780	—	9,808	—	21,588	—

The percentage composition of the worm population by species and the calculated anthelmintic efficiency for each species is shown (table 3).

TABLE 3—Percentage Composition of Worm Population and Calculated Anthelmintic Efficiency Against the Various Species

	Group 1 (100 mg./kg.)		Group 2 (200 mg./kg.)		Group 3 (control)
	Population (%)	Efficiency (%)	Population (%)	Efficiency (%)	Population (%)
Abomasum					
Ostertagia circumcincta ♂♂	16.3		10.9		23.3
O. trifurcata ♂♂	0.7	60.3	1.6	96.5	2.5
Ostertagia sp. ♀♀	29.8		12.4		31.7
Ostertagia sp. immature	5.7	0	8.5	13.8	0.8
Trichostrongylus axei ♂♂	21.3	37.8	18.6	91.0	16.7
T. vitrinus ♂♂	0	100	0	100	2.5
Trichostrongylus sp. ♀♀	26.2	43.2	48.0	82.8	22.5
Small Intestine					
Trichostrongylus vitrinus ♂♂	16.8	80.4	1.0	99.8	30.8
T. colubriformis ♂♂	23.4	0	42.7	55.9	5.0
Trichostrongylus sp. ♀♀	32.1	78.7	16.7	98.4	54.2
Nematodirus filicollis ♂♂	8.8	0	5.2	84.4	1.7
N. spathiger ♂♂	3.6	23.9	8.3	74.8	1.7
Nematodirus sp. ♀♀	13.1	29.8	21.9	83.1	6.7
Strongyloides papillosus	2.2	0	2.1	0	0
Capillaria longipes	0	—	2.1	0	0

DISCUSSION

No evidence of intoxication was seen at the dose levels used in this trial.

In general, the results are comparable with those reported for another organic phosphate (Dowco 105). It appears that compounds of this type are generally more efficient in the small intestine than in the abomasum. This, however, may be largely the result of inherent species resistance to the drug. In the case of *Trichostrongylus vitrinus*, the only species inhabiting both organs, anthelmintic efficiency appears to be comparable or possibly slightly better in the abomasum.

Although indirect evidence in a previous trial indicated that this class of drugs may have some effect on immature stages of nematodes, this was not confirmed in the present experiment. Even at the highest dose level, the effect of the drug on immature Ostertagia in the lumen of the abomasum was not appreciable (table 3). However, it was reported that a related compound (Bayer 21/199) was effective against immature forms in the lumen of the gastrointestinal tract, but not against those in the wall of the abomasum.[4] Those authors reasoned, on the basis of this evidence, that the action of Bayer 21/199 was directly against the parasite, rather than through the circulatory system.

The evidence clearly indicates that the new compound is a promising anthelmintic for sheep, and that further critical trials should be undertaken to determine optimum dosage schedules and to investigate its potential usefulness for other species of animals.

SUMMARY

Ruelene, 4 - tert - butyl - 2 - chlorophenyl methyl methylphosphoramidate, was tested for anthelmintic activity in naturally infected lambs. At a dose level of 200 mg./kg. of body weight, it was highly efficient against Ostertagia, *Trichostrongylus axei*, *T. vitrinus*, and Nematodirus. Its effectiveness against *Trichostrongylus colubriformis*

was somewhat less, but still reasonably good. No evidence of toxicity was noticed. It is considered to be a promising compound which warrants further investigation.

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Sheep Laurel Poisoning in the Cat — A Case Report

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Small animal practitioners frequently encounter cases which are puzzling and which, because of recovery of the animal through empirical treatment, lack of cooperation on the part of the client, or pressure of time, remain a mystery. The following report provides interesting and valuable information.

On Feb. 9, 1959, examination of a 5-month-old female cat revealed watery ocular discharge, salivation, nasal secretion, and body temperature of 102.6 F. According to the owner, the signs had developed that day. They seemed to indicate a respiratory condition often seen in cats, so we injected antibiotics and prescribed an oral antibiotic and an eye ointment.

While on the examination table, the cat appeared to be attempting to run, which we attributed to fear. In retrospect, however, the paddling of the limbs seemed to be an involuntary action.

During the evening, the owner telephoned three times that the cat had intermittent running convulsions with arching of the back and salivation. We asked the owner about insecticides, rodenticides, or plants which the animal may have had access to. The owner recalled that there were some leaf arrangements in the house, and that the cat had been eating them.

The owner brought the now moribund cat back, and despite the use of sedation, it died. Some of the suspected branches from the leaf arrangement were obtained, and we tentatively identified the plant as sheep laurel, *Kalmia angustifolia*. Subsequently, the Brooklyn Botanical Gardens positively identified it as sheep laurel. The toxic principle is andromedotoxin. The clinical signs are salivation, lacrimation, increased flow of secretions from the nose, emesis, convulsions, and later paralysis of the limbs;[1] death also is caused by this toxin.[2]

On necropsy, fragments of the glossy, leathery leaves were found in the stomach and throughout the small intestine. There were no pathologic changes.

The distribution of the plant is eastern North America, chiefly in the Appalachian Mountains, and it grows on rocky or stony hillside woodlands and pastures with acid soils. Mountain laurel, *Kalmia latifolia*, will cause the same signs.

On May 13, 1959, we received a call from a distressed client who described similar signs in a cat. Becoming alarmed at the running fits and salivation, the owner had locked the animal in the bathroom. Questioning revealed that the owner had some bouquets and these had been filled out with leafy branches. We asked the owner to bring the cat and some branches in immediately. The plant was sheep laurel. Although some of the leaves showed evidence of having been nibbled on, the cat had eaten little of the plant and recovered by the following day.

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Dr. Wasserman is a small animal practitioner in Brooklyn, N.Y.

Error—Treatment of Filaroidiasis in Dogs

In this item which appeared in the Oct. 1, 1959, JOURNAL (p. 397), the dosage of cyanacethydrazide is in error. The first sentence of the item should read: *Six Boxer dogs, 4 months to 5 years old, infected with Filaroides osleri were treated with cyanacethydrazide (Dictycide), 1 gr./10 lb. of body weight daily.*

Leptospira pomona Isolation from Naturally Occurring Canine Infections

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TWO ISOLATIONS of *Leptospira pomona* from naturally infected dogs have been reported.[3,5] Serologic evidence of *L. pomona* antibodies in canine serum has been observed.[1,4,5] *Leptospira pomona* infections have been experimentally established in young dogs.[2]

This report of the isolation of *L. pomona* from the urine of 2 dogs, kept on the same premises with cattle whose serum gave a positive-agglutination reaction with *L. pomona*, presents an interesting epidemiologic pattern.

The original serologic evidence of leptospirosis on the farm was found on a routine agglutination-lysis test of the serum of a dog, which was examined at the Department of Microbiology and Public Health, Michigan State University. The 8-month-old male German Shepherd Dog had a serum titer of 1:10,000 for *L. pomona*, 1:10 for *L. icterohaemorrhagiae*, and was negative to 1:10 for *L. canicola*.

To establish the incidence of leptospirosis on the farm, more blood samples were obtained from 19 dogs and 18 cattle. Six of the dog serums were positive at dilutions of 1:1,000 or 1:10,000 for *L. pomona*, while showing no significant reaction to *L. icterohaemorrhagiae* or *L. canicola* antigens. Six of the bovine serums gave significant agglutination-lysis reactions with maximum titers of 1 to 10,000 for *L. pomona*.

On the basis of the serologic evidence of infection, isolations of leptospires from the urine of both the cattle and dogs were undertaken. Catheterized urine samples were obtained from serologically positive animals — 5 dogs and 4 cows. Two milliliters of each urine sample was immediately inoculated intraperitoneally into 3, 250-Gm. guinea pigs. Urine samples were obtained by bladder tap from 2 dogs, and inoculated directly into Stuart's medium (Bacto-Stuarts medium base; code 0988). Each of the five tubes of medium was inoculated with three to five drops of urine.

Rectal temperatures of the guinea pigs were taken daily following inoculation. On postinoculation days 8 and 9, guinea pigs inoculated with urine from 2 of the dogs had rectal temperatures of 104 F. or higher. Blood obtained by heart puncture from those guinea pigs showing a febrile response was inoculated into Stuart's medium and other guinea pigs. These cultures were checked by dark field illumination.

Leptospires were isolated directly from the urine of 1 dog by cultural methods (table 1). Isolations were achieved from the guinea pigs inoculated with urine from 2 dogs, and positive agglutination-lysis reactions occurred in the serums of guinea pigs inoculated with urine from 3 dogs. No evidence of leptospiruria was obtained in the 2 dogs by either direct cultures or guinea pig inoculations. Leptospires were not isolated from any of the four bovine urine samples.

DISCUSSION AND RESULTS

Serologic evidence of leptospirosis in cattle and dogs on the same farm prompted an attempt to determine the cause. The clinical history did not indicate the presence of a leptospiral infection in either species. The cattle had had no drop in milk flow, no abortions, no hemoglobinuria, and no other assident signs. Some of the immature dogs had been slightly depressed, with a concurrent mild febrile state. No isolations were made from the cattle, but leptospires were isolated from the urine of 2 dogs. Isolation was made from 1 dog by direct inoculation of urine into a medium, as well as from guinea pigs inoculated with urine. Leptopsires were isolated from the urine of the other dog by guinea pig inoculation and subsequent guinea pig blood cultures.

A subculture of the leptospiral organism has been identified at Walter Reed Army

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TABLE I—Summary of Data for Leptospira pomona Infection in Dogs

Age and sex of dog	Agglutination-lysis titer	Direct urine culture	Guinea pig inoculations		
			Pyrexia >104 F.	cultural isolation	serology
8 mo. male	4*	N.A.**	+	+	+
6 mo. male	4	N.A.	−	−	−
8 mo. male	3	N.A.	−	−	+
6 mo. female	4	+	+	+	+
1 year male	4	Contaminated	−	−	−

*Reciprocal of log 10 serum dilution; **not attempted.

Institute of Research as *L. pomona*, and has been assigned accession No. 1738.[6]

Of the 6 dogs serologically positive to Leptospira, 1 was 2 years old, 1 was 1 year old, 2 were 8 months old, and 2 were 6 months old. The dogs were housed in a common barn with the cattle. Many of the younger dogs were allowed to mingle freely with the cattle. The close contact between the younger dogs and the cattle, and the high concentration of dogs could account for the *L. pomona* infection. It would be impossible to define the type of transmission occurring, *i.e.* dog to dog, dog to cattle, or cattle to dog. The occurrence of an *L. pomona* infection in several dogs indicates the susceptibility of dogs to this organism under field conditions. The dog often is in more intimate contact with members of a family than other farm animals. This experience shows the need of checking farm dogs more carefully for inapparent leptospirosis, because of the human health hazard. The isolations of the causal agent from the urine of the dogs indicates the possible role of the dog in transmission of *L. pomona* to man and livestock.

SUMMARY

Six dogs and 6 cattle on the same farm were found serologically positive for *Leptospira pomona*.

The isolation of *L. pomona* from the urine of 2 dogs indicates that the dog should be considered a part of the epidemiologic pattern in this disease.

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Effect of Rinderpest Virus on Canine Distemper

In Kenya, none of the cattle inoculated with canine distemper virus showed a clinical response and all were susceptible to rinderpest virus when challenged. Dogs given a single, subcutaneous inoculation of rinderpest virus, although showing no clinical reaction, later proved refractory to canine distemper virus. Administration of rinderpest-immune bovine serum barely influenced the course of distemper in dogs.

Considering these results, and other reports in the literature, the authors suggest the possibility that canine distemper, rinderpest, and measles represent evolutionary descendants of a parent pathogen of carnivores, ungulates, and man, respectively.—*J. B. Polding et al. in Vet. Rec., 71, (Sept. 19, 1959): 643.*

Canine Venereal Tumor Subsides with Podophyllin Therapy

Transmissible venereal tumor in dogs is a granulomatous-type lesion which histologically resembles a round cell sarcoma. It is world wide in distribution and has no special predisposition for breed or sex.

Six dogs responded to treatment with 10 per cent podophyllin suspended in liquid paraffin. In some cases, tumors disappeared after only three or four applications.

Surgical excision of these tumors has been reported as a successful technique. It is the only tumor in animals in which transmission occurs from one surface to another by viable cells.—*A. M. Harthoorn in Brit. Vet. J. (July, 1959): 249.*

Hypopituitarism Associated with Cystic Rathke's Cleft in a Dog

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A REVIEW of the veterinary literature indicates that hypopituitarism in the dog as a result of cystic formation of Rathke's cleft is relatively rare.

Grossly, the hypophysis cerebri in mammals consists of an anterior and a posterior lobe. Microscopically, the posterior lobe is subdivided into two distinct portions, the pars nervosa and the pars intermedia. The anterior lobe is known as the pars distalis. Also, a thin layer of cells extends over the base of the brain in the immediate vicinity of the hypophyseal stalk which is called the "pars tuberalis." In the dog there is a funnel-shaped infundibular cavity extending down from the third ventricle to the upper portion of the pars nervosa.

Rathke's pouch, an invagination from the roof of the primitive oral cavity,[3] becomes constricted in the process of development and a sac with a narrow stalk is formed. The sac eventually closes and the stalk, originally connected with the mouth, usually disappears. This stalk persists in some cases, and it is from this epithelial rest that tumors of the stalk have their origin. The anterior portion of the original Rathke's pouch develops into the pars intermedia; the remainder becomes greatly thickened to form the pars distalis. Portions of the pouch persist in the adult dog as a narrow cleft separating the pars distalis from the pars intermedia. This is known as Rathke's cleft.

The pars nervosa arises as a downward evagination from the floor of the diencephalon in the region of the tuber cinereum. It is more or less completely enveloped by the pars buccalis. It contains a funnel-shaped extension of the third ventricle, the infundibulum, which is well developed in the dog.

A characteristic feature of the pars intermedia of many hypophysis is the presence of numerous cysts of varying sizes. These consist of rather irregularly shaped cavities of different sizes filled with colloid and hyaline material and often degenerating cells. Cysts occasionally found in the region of the hypophysis are lined with ciliated epithelium, presumably arising from the hypophyseal cleft.[1]

Fig. 1—Notice the size of animal for its age (1 year). Except for the tufts of hair, the coat is sparsely covered with wiry type of hair.

CLINICAL HISTORY

On Aug. 26, 1958, a female German Shepherd Dog, 1-year old, was referred to this clinic by a neighboring veterinarian. The owner was concerned about the dog's coat which showed an irregular distribution over the body. The client also expressed concern about the size of the dog since a litter mate had grown much larger in the last few months.

Clinical examination revealed areas of the skin to be covered with tufts of hair which appeared nearly normal in length, texture, and density for the breed, while the remaining areas were sparsely covered with short, wiry hair (fig. 1). There was hyperkeratosis and hyperpigmentation of the skin. The melanin pigmentation of the skin was most pronounced in the posterior

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The author thanks Dr. William Monlux, professor, Department of Veterinary Pathology, Iowa State University, for his assistance in providing the gross and microscopic pathologic findings listed in this report.

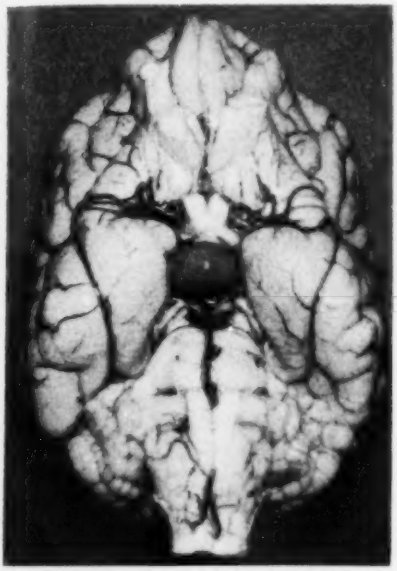

Fig. 2—Tumorous mass in the region of the hypophysis.

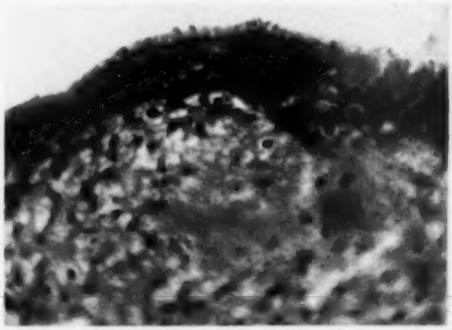

Fig. 3—Ciliated columnar epithelium lining one of the multiple cysts of Rathke's cleft. x 475.

abdominal and inguinal regions. The head and feet appeared to be that of a mature adult dog. She resembled a coyote in appearance. She weighed 25 lb., measured 18 inches to the top of the shoulder and 23 inches to the top of the head, and appeared to be in moderately good condition. Mentally, she was alert, reasonably active, and responded to commands. She ate and drank with no difficulty, and there was no evidence of motor impairment. There were no abnormalities of growth or hypoplasia of the genital tract. A functional disturbance of the endocrine system was probably present, since the owner had not observed signs of estrus. A clinical diagnosis of tumor of the pituitary gland was made. Laboratory procedures revealed the following:

Total leukocyte count	15,000/cmm.
Eosinophils	100
Stab cells	3,700
Segmented neutrophils	6,700
Monocytes	0
Lymphocytes	4,500

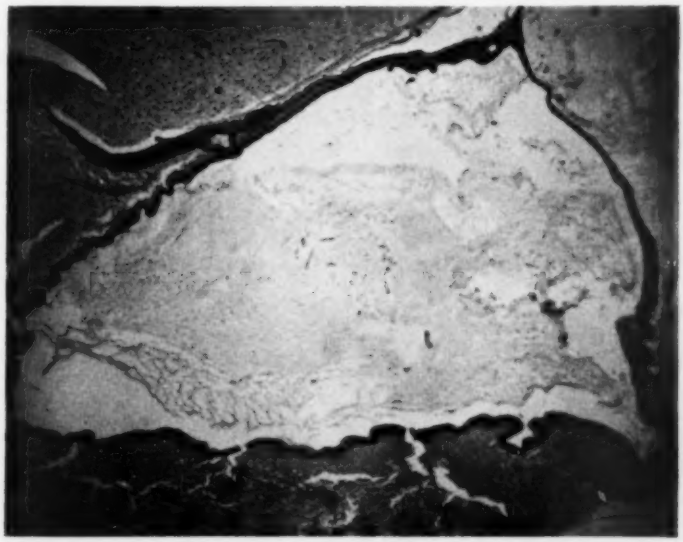

Fig. 4—One of the multiple cysts of Rathke's cleft filled with mucin. x 65.

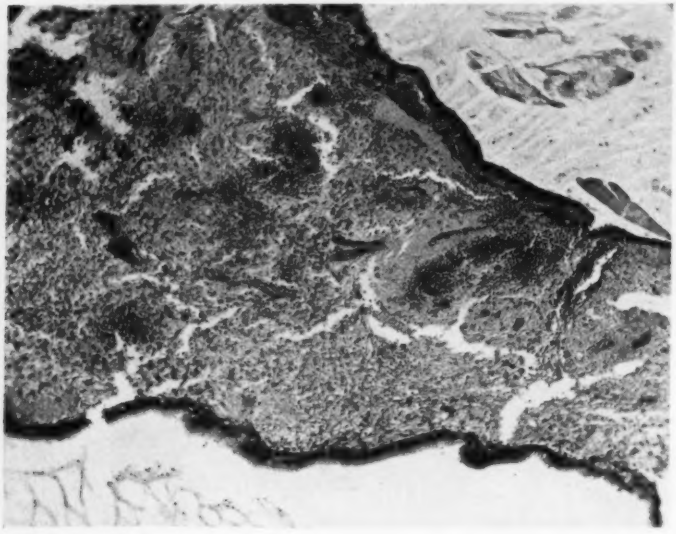

Fig. 5—Compressed and atrophic pituitary tissue located between two cysts. x 75.

Total erythrocyte count	7,150,000/cmm.
Hemoglobin	13.44 Gm./100 cc.
Packed Cell Volume	51 per cent
Urinalysis	
Specific gravity	1.014
Reaction	pH5
Albumin	Negative
Sugar	Negative
Liver function (methylene blue)	1 drop

Since no satisfactory therapy could be instigated to correct the condition, euthanasia was recommended.

POSTMORTEM EXAMINATION

Necropsy revealed no abnormalities other than those observed in the skin and hypophysis cerebri. A cystlike structure approximately 10 by 10 by 5 mm. in diameter was found in the region of the hypophysis cerebri (fig. 2). It contained an opalescent fluid. Grossly, no normal hypophyseal tissue could be observed in the area. The cystic mass was attached to the ventral surface of the brain by a slender stalk which was assumed to be the hypophyseal stalk. The mass had not caused any visible atrophy of the brain, bone, or other structures in the area. No abnormalities of the ventricular structures of the brain were noted.

The brain was fixed in 25 per cent formalin solution, and then sagittal sections 5-mm. in thickness were made.

Histologic examination revealed that the mass was composed of multiple cysts that varied in size from 200 μ to 3 mm. in diameter. The cysts were lined with ciliated columnar-type epithelium similar to that observed in Rathke's cleft (fig. 3). The cysts contained a protein substance that stained slightly blue with hematoxylin, indicating that it was mucin (fig. 4). Thionin stain also showed the protein substance within the cysts to be mucin. The cystic contents were not calcified. A small amount of hemosiderin and disintegrating erythrocytes was present in the cyst contents. The small amount of pituitary tissue still remaining showed pressure atrophy and scattered areas of edema and hemorrhage (fig. 5).

DISCUSSION

This condition must not be confused with tumors or cysts of the hypophyseal stalk, since they do not originate from Rathke's cleft. Unless there is strong reason to suspect an ependymal origin of these cysts, they should be regarded as arising from Rathke's cleft.[2] The feature which differentiates these cysts from other cysts in the region is the presence of a single layer of ciliated columnar epithelium. The ciliated epithelium strongly indicates that the cysts arose from Rathke's cleft; however, similar ciliated cells may occasionally arise from the ependyma of the ventricular

system. The lack of connection with the ventricular system and the presence of ciliated columnar epithelial cells rather than cuboidal cells indicated the cysts in all probability arose from Rathke's cleft.

One writer[1] reported it is possible that ciliated cells of the hypophysis may be due to abnormal migrations of embryonal elements from the nasopharynx during fetal development where ciliated and mucin-secreting cells are normally present. He also stated that tall columnar cells with numerous delicate cilia occasionally occur in the epithelium lining the residual lumen and cysts in the region of the pars intermedia of the human hypophysis that otherwise are essentially normal. Some of these cells apparently secrete a mucin-like material or undergo mucin degeneration.

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[1]Bailey, P.: The Structure of the Hypophyseal Cerebri of Man and of the Common Laboratory Animals. In "Special Cytology." Vol. 1. E. V. Cowdry, Paul B. Hoeber, Inc., New York, N.Y. (1928): 487-499.

[2]Duffy, W. C.: Hypophyseal Duct Tumors. Ann. Surg., 72, (1920): 537, 725.

[3]Frazier, C. H., and Alpers, B. J.: Tumors of Rathke's Cleft (Hitherto called tumors of Rathke's pouch). Arch. Neurol. and Psychiat., 32, (1934): 973-984.

[4]Rasmussen, A. T.: Ciliated Epithelium and Mucin Secreting Cells in the Human Hypophysis. Anat. Rec., 41, (1928): 273-284.

Extragenital Venereal Granuloma in the Abdominal Organs of a Dog

PAUL V. BELKIN, D.V.M.

St. Louis, Missouri

A MONGREL bitch, 1½ years old, was examined and hospitalized Sept. 10, 1958, because of gradual weight loss for two months. Three days before, she had begun to vomit several times a day and had developed diarrhea. She moved cautiously, with tucked up abdomen and stiffness of the extremities.

CLINICAL EXAMINATION

Examination revealed extreme anemia, emaciation, dull coat, and dehydration. Body temperature was 103.5 F. Abdominal palpation seemingly caused discomfort in the posterior region and revealed a greatly enlarged bladder and a tumorous mass anterior to the pubis.

The dog drank large quantities of water but would not eat. Defecation was accompanied by grunting and prolonged tenesmus. Stools were loose, gray, and contained considerable quantities of mucus, blood, and gelatinous material.

Proctoscopic examination was carried out 30 minutes after 0.25 gr. of morphine and 20.0 mg. of promazine hydrochloride were administered intramuscularly. The mucosal folds of the rectum appeared normal, but the normal pattern of the mucosa of the terminal portion of the colon was lost. The surface appeared smooth and shiny, with several bluish elevated areas of variable shape ranging in size from 5 mm. to 2 cm. Several inches in front of the pubis, there was strong resistance to passage of the tube and complete examination could not be carried out.

A lateral radiograph (fig. 1), taken 20 minutes after an intravenous injection of 12 cc. of 75 per cent sodium iodomethamate (Neo-Iopax*), revealed a greatly enlarged bladder, with thickened wall, and an abnormal relationship of the colon to the neck of the bladder. No definite diagnosis was made and the owner requested euthanasia.

NECROPSY FINDINGS

At necropsy, a large tumorous mass was found along the greater curvature of the stomach from the cardia to the pyloric antrum. It was dark, hard, and firmly attached to the stomach wall. The mucosal folds of the stomach were absent and three ulcers about 1.5 cm. in diameter were present on the flattened surface.

The spleen appeared to be atrophied and contained numerous areas of scar tissue on both the external and cut surfaces. There was generalized enlargement of all lymph

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*Neo-Iopax is manufactured by Schering Corp., Bloomfield, N. J.

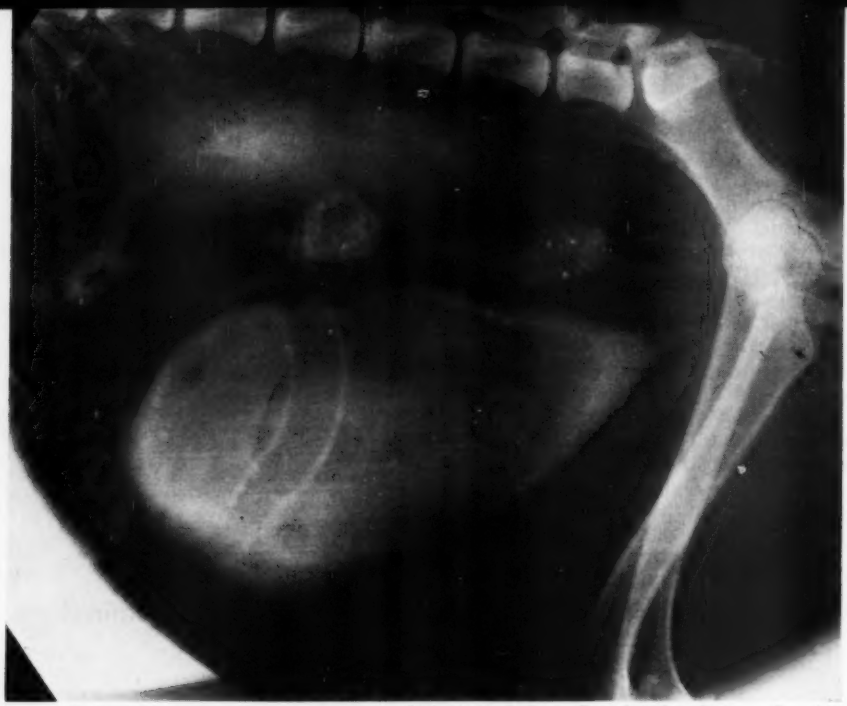

Fig. 1—Lateral cystogram of a dog, showing thickening of the wall and trabeculations of vesicle mucosa, stretched vesicle neck, and thickening of the colon in the region of the bladder neck.

nodes throughout the abdominal and pelvic cavities. The wall of the entire colon was irregularly thickened. Tumorous growths were observed grossly in some areas, and in others they could be palpated as irregular masses ingrown throughout the length of the colon. Mucosal folds were absent in the greater part of the colon, and the most extensive thickening of the wall was present in the terminal portion (fig. 2).

The wall of the bladder was thickened and the mucosal surface had numerous trabeculations, indicating classification as an eccentric type of hypertrophy.[1]

Tissue specimens sent to the Armed Forces Institute of Pathology resulted in the following report.

This lesion is a member of a poorly defined group of canine tumors which are presently being interpreted as extragenital transmissible venereal tumors.

The cellular anaplasia and marked infiltrative activity which are so obvious on microscopic examination belie the usually benign clinical course which this lesion demonstrates. Metastasis is distinctly rare, and spontaneous regression is frequent. The lesion has been incompletely studied and at the present time its true neoplastic nature is questioned.

[1]Bloom, Frank: Pathology of the Dog and Cat. American Veterinary Publications, Santa Barbara, Calif. (1954): 171.

Fig. 2—Photograph of the terminal colon of a dog, showing thickening of the wall and numerous granulomas.

Hypomagnesemia and Feeding

Hypomagnesemia, which in the final stages may result in tetany or paralysis, often follows crude protein poisoning. The diet may contain an excess of proteins which are destroyed in the rumen. The ingesta leaving the rumen will contain too little bacterial and protozoal protein and too much albuminoid substances and nitrogenous protein disintegration products; this results in putrefaction, fermentation, and an abnormal flora in the small intestine.

The same condition can occur when growth of the rumen flora is interfered with by the introduction of ammonia, a large quantity of potassium salts, mercury poisoning, or antibiotics. The disease is more apt to be acute when the cows are on pasture and chronic when in the stable.

Hypomagnesemia can be prevented by a correct protein-starch ratio in the diet. When there is an excess of proteins of young grass, about 10 per cent more starch should be fed, also 4 to 5 kg. of good hay. Adequate minerals in the diet are important but the addition of minerals has little effect. Rumenal indigestion can be prevented with adsorbent charcoal or magnesium oxide.—*J. S. Reinders in Tijdschr. Diergeneesk. (June 15, 1959): 630.*

Nutrition and Reproduction in Boars

Three groups of 3 weanling New Hamshire boars were given 100 per cent, 70 per cent, and 50 per cent of a ration recommended for growing boars for 312 days. At puberty, their average ages were 203, 212, and 219 days and their average weights were 223, 171, and 135 lb., respectively. Those on the higher plane of nutrition produced larger volumes of semen, but the character of their semen and their fertility records were not significantly affected.—*J. Anim. Sci. (Feb., 1959): 3.*

Feed Texture and the Proventriculus

A high percentage of chicks fed a purified diet, chiefly soybean protein and glucose, developed an enlarged proventriculus. The muscle was atrophic, the glands hypertrophied. The gizzard was poorly developed and the crop pendulous.

This condition was prevented by adding corn meal or ground wheat to make the diet more coarse, but not by adding sand or grit.—*Poult. Sci. (March, 1959): 296.*

Vitamin D and Parturient Paresis

When 130 Jersey cows, previously affected with parturient paresis, were fed 30 million U.S.P. units of vitamin D daily for several days before and for two days after calving, at the Maine Agricultural Experiment Station, 23 per cent developed the disease, compared with 61 per cent of the 31 similar controls.

Of 155 previously unaffected cows, 6 per cent of those fed the vitamin developed the disease compared with 22 per cent of similar cows not treated.

In the group of previously affected cows, the lowest incidence of parturient paresis (17.64%) occurred in those fed the vitamin for two to four days before parturition. In the group of non-affected cows, none of 53 fed the vitamin two or three days developed the disease.

It is suggested that prolonged intake of vitamin D before calving may reduce its effectiveness as a preventive of the disease.—*Ayrshire Dig. (May 15, 1959): 324.*

Is Parturient Paresis an Allergy?

After experiencing failures in the treatment of parturient paresis in cows with calcium chloride solution and vitamin D, the author, in Germany, had good results with 20 to 40 ml. of the calcium preparation intravenously combined with an antihistamine. He suggests that the condition is an allergy caused by proteins in the milk.—*Vet. Bull. (April, 1959): Item 1160.*

• • •

The theory that parturient paresis is caused by hypocalcemia is questioned. (Allergic conditions are often favorably influenced by calcium therapy.) It was shown that cows could be sensitized with colostrum from other cows affected with parturient paresis but not in all cases. The colostrum of first-calf heifers seemed free of the allergic agent. Cows which had been sensitized with small quantities of colostrum (2 to 3 cc.) sometimes showed violent reactions in 30 minutes.—*H. Glattli in Die Vet.-med. (Jan., 1959): 15.*

Editorial

Kansas City Survey—Denver Plans

While the highly successful convention in Kansas City is still a pleasant memory in the minds of the thousands who attended, we need to glance both backward and forward at the matter of scientific programs.

The Survey at Kansas City

At the direction of the Executive Board Committee on Scientific Programs, a survey was made to ascertain audience reaction to the program at Kansas City as the first step in a long-range plan for continued improvement of scientific programs at the AVMA conventions. The number of people answering card questionnaires was not as large as desired for some sessions, but the real value of such surveys may be more apparent several years hence, when trends should be recognizable. However, the response to several survey questions is interesting now.

A Good Program

To a question pertaining to the individual's evaluation of the entire program, 287 persons responded thus:

Excellent	24 per cent
Good	50 per cent
Fair	23 per cent
Poor	3 per cent

Pictures versus Plain Papers

Asked to indicate the type of presentation preferred, in order of preference, 287 persons gave 524 responses showing decided endorsement of illustrated reports.

Illustrated lectures	40 per cent
Television	27 per cent
Movies	13 per cent
Panel discussion	13 per cent
Lecture	7 per cent

Should Discussions Be Permitted?

The programming technique which provides for audience discussion of papers appears to be used more often in other countries than in ours and many of us decry the tendency for American programs to be so "tight" or "packed" that discussion is impossible. It was somewhat surprising, then, that of 287 respondents 56 per cent indicated a preference for the discussion-type arrangement. Although this was a majority, the margin was smaller than expected.

What of the Denver Program?

Already, the section officers and the local committee on arrangements have held one meeting at Denver where they reviewed facilities, procedures, and policies, and set dates and times for the section meetings. By Jan. 1, 1960, they will have issued invitations to program speakers, and when they next meet on April 8, they will have drafted the tentative program. They will have selected more than a hundred program items from among many possibilities, will have written hundreds of letters, and will have made many contacts by other means.

What Can You Do Now?

Section officers are now busily making the contacts that will lead to interesting program items. Once invitations have been issued and the acceptances received are sufficient to fill the session programs, even the most promising proposals cannot be considered. If you feel that you can make a worthwhile contribution to our next national meeting or know someone who can, send, *this month*, full and pertinent details to one of the following section secretaries:

General Practice
Melvin W. Osburn
1525 Humboldt St.
Manhattan, Kan.

Research
Nicholas H. Booth
College of Veterinary Medicine
Colorado State University
Fort Collins, Colo.

Small Animals
Alfred G. Schiller
Veterinary Clinic
University of Illinois
Urbana, Ill.

Poultry
Henry E. Adler
School of Veterinary Medicine
University of California
Davis, Calif.

Surgery and Obstetrics
John W. Kendrick
School of Veterinary Medicine
University of California
Davis, Calif.

Public Health and Regulatory Veterinary Medicine
Robert J. Schroeder
9738 Tecum Rd.
Downey, Calif.

Abstracts

Pathogenesis of Hog Cholera

When 10^5 lethal doses of hog cholera virus were inoculated directly into the blood stream of susceptible swine, it could not be detected in the blood after 15 minutes but reappeared in the blood after 12 to 16 hours. If 10^6 lethal doses of virus were inoculated intravenously, the virus could be detected as early as five hours and there may not have been a period in which the virus was completely absent from the blood stream. When swine were exposed by the tonsillar route, virus was detected in the blood stream after 24 hours but not 16 hours. Earlier work indicated that it also could not be detected at 20 hours.

Pigs did not die and were not immune to subsequent challenge when exposed to frozen and unfrozen blood and lymphatic tissues taken from swine which had been infected intravenously with 10^5 lethal doses of hog cholera virus and killed at two, five, and eight hours after infection. Pigs given the samples taken during the latter periods of infection appeared to be sensitized to challenge with virulent virus.

It is believed that the incomplete virus particles formed during the period of early virus multiplication in the tissues were incapable of stimulating an antibody response to the entire particle of virulent virus. It provoked instead an interference with early anti-hog cholera antibody production and with the little natural resistance that was available in the susceptible pig. The challenge of such sensitized pigs was characterized by shorter incubation periods, higher temperatures, shorter courses of infection and more severe lesions at the time of death. Sixty-two pigs were used in conducting these experiments.—[*H. W. Dunne and A. J. Luedke: The Pathogenesis of Hog Cholera. II. The Virus Eclipse Phase and Sensitization of the Host. Am. J. Vet. Res., 20, (July, 1959): 619-624.*]

Relationship of Diet to Parasitism in Cattle

Four experiments involved 30 cattle; 14 of these were used as control animals. The diets compared were fescue hay versus alfalfa hay and fresh fescue versus a fresh legume-grass mixture. The test animals were given known numbers of infective larvae of a mixture of common species of gastrointestinal nematodes of cattle in single doses. The worm infections produced were moderate to heavy. The uninfected cattle fed alfalfa and the legume-grass mixture gained about 10 per cent more per pound of feed consumed than the uninfected fescue-fed cattle.

Cattle with comparable infections did not show significant differences in weight gain due to diet. The differences between the weight gains of infected versus uninfected animals, irrespective of diet, were usually much greater than the differences due to diet. In general, the severity of clinical signs and of pathological changes observed at necropsy were related to the degree of infection rather than to diet. However, the cattle fed fescue passed 80 per cent more eggs in their feces and harbored 16 per cent more worms at necropsy than those on the other diets.—[*A. Goldberg: The Relationship of Diet to Gastrointestinal Helminth Parasitism in Cattle. Am. J. Vet. Res., 20, (Sept., 1959): 806-814.*]

Typing Staphylococcus aureus of Animal Origin

Staphylococcus aureus cultures of animal origin were relatively resistant to the phages routinely used in typing cultures of human origin. However, two phages, 42D and 81, were found to have some ability to produce lysis. "Adaptation" of the human typing phages by propagation on a culture of animal origin increases their ability to lyse *Staph. aureus* cultures of animal origin. However, a relatively high percentage of the animal staphylococci remain resistant to the "adapted" phages.—[*E. H. Coles and A. Eisenstark: Staphylococci Phages. II. The Use of Human Typing Phages and Adapted Human Typing Phages in the Typing of Staphylococcus Aureus of Animal Origin. Am. J. Vet. Res., 20, (Sept., 1959): 835-837.*]

Phenothiazine for Haemonchus contortus in Sheep

The efficacy of single therapeutic doses of phenothiazine against a resistant strain B, and a control or nonresistant strain A, of *Haemonchus contortus* was studied in a series of seven experiments in which 42 helminth-free lambs were used.

Dosage at the rate of 0.1 gm. per pound of body weight was highly effective against strain A, reducing post-treatment 24-hour egg and larval counts on feces 99.4 and 99.1 per cent, respectively, and removing an average of 89.0 and 97.7 per cent of the male and female worms, respectively. Corresponding averages for this dosage level against strain B were 68.2 and 79.5 per cent reductions of the egg and larval counts, and 56.0 and 69.5 per cent removal of the male and female worms, respectively.

The 0.25 gm. per pound dosage level was 100 per cent effective in reducing strain A egg and larval counts and removed an estimated 99.2 and 99.9 per cent of the male and female worms, respectively. This dosage was somewhat less effective against strain B, reducing the egg and larval counts an average of 96.4 and 95.5 per cent and removing 76.3 and 95.9 per cent of the male and female worms, respectively.

In single trials at the 0.5 gm. per pound dosage level, complete removal of strain A worms was observed, whereas only 44.1 and 76.2 per cent of the strain B female worms were removed and egg and larval counts were lowered 87.9 and 97.3 per cent, respectively.

A significant reduction of average daily produc-

tion and larval development of surviving females during the four- to seven-day post-treatment interval was observed for strain A but not strain B. Female worms of both strains and at all dosage levels were removed more effectively than the males.

The two and one half-fold difference between the thresholds of these two strains to single therapeutic doses in the present tests compares favorably with the four- to eight-fold difference to small daily doses in previous studies. This relative resistance of strain B to phenothiazine is regarded as exceptional and other factors should not be overlooked in evaluating an apparent failure or lack of effectiveness of phenothiazine in a flock with a parasite control problem.—[*J. H. Drudge, S. E. Leland, Z. N. Wyant, G. W. Elam, and L. B. Hutzler: Strain Variation in the Response of Sheep Nematodes to the Action of Phenothiazine. IV. Efficacy of Single Therapeutic Doses for the Removal of Haemonchus contortus. Am. J. Vet. Res., 20, (July, 1959): 670-676.*]

Typing Staphylococcus aureus from Bovine Udders

Two adapted human typing phages and a phage isolated from a lysogenic strain of *Staphylococcus aureus* of animal origin had host ranges that might make them usable for epidemiological studies in bovine mastitis. Three additional phages were isolated that had host ranges not as definite but which still might be usable as auxiliary typing phages. Evidence indicated that in most herds of cattle more than one strain of *Staph. aureus* is present, and a single cow may harbor more than one type of *Staph. aureus* in her udder.—[*E. H. Coles and A. Eisenstark: Staphylococcic Phages. III. Typing of Staphylococcus Aureus Cultures Isolated from the Bovine Udder. Am. J. Vet. Res., 20, (Sept., 1959): 838-840.*]

Experimental Trichostrongylus axei Infections

Data from 11 calves, 3 to 5 months old at the time of infection, indicated the $l.d._{\infty}$ was 500,000 larvae. Pathogenicity of the horse strain of *Trichostrongylus axei* (Cobbold, 1879) used appeared to be greater than that of other strains studied in these animals. The worm recovery from 11 untreated calves ranged from 59.9 per cent at 41,000 larvae administered to 12.3 per cent at 1,500,000 larvae administered, with an average of 34.7 per cent. The interval between infection and death ranged from 17 to 39 days, with an average of 27.3 days. The average prepatent period in 12 animals was 21.3 days. The male/female worm ratio in 11 untreated animals averaged 0.77. The egg-laying potential in 6 animals ranged from 6.1 to 97.0 and averaged 41.6 eggs per 24 hours per female worm.

The more consistent pathological findings were: (1) body weight was reduced; (2) carcass was in extremely poor condition at the higher larval dose levels; (3) very little body fat was present; (4) degeneration of omental fat was observed; (5) the abomasal mucosa in acute fatal cases was extremely hyperemic (beet red) with scattered flecks or patches of whitish necrotic debris adhering to the surface, while in infections of eight to 12 weeks duration it showed a more chronic type response with a swollen and puffy appearance of the mucous epithelium in the pyloric region with little hyperemia; and (6) in severe cases the hyperemia was also observed in the first few inches of the duodenum. Microscopic examination of sections of the abomasum revealed a thick layer of cells, cellular debris, and necrotic material covering areas of the mucosa, forming a diphtheritic-type membrane, and sloughing of the surface epithelium.

In animals receiving 500,000 or more larvae, packed red cell volume (PRCV) was decidedly elevated three weeks after infection. Thereafter, in surviving animals the PRCV dropped with values falling in the normal range by the eighth week. From the ninth week to the end of the observational period, the PRCV was reduced below normal as compared with preinfection or equivalent uninfected control values.

Differential leukocyte counts indicated an increase in the percentage of lymphocytes from the third through the fifth week postinfection.

The administration of phenothiazine at 20 Gm./100 lb. resulted in a treatment efficacy of 50.0 to 98.8 per cent in heavily infected animals. Two treatments at this dose level were necessary to achieve the 98.8 per cent worm removal. However, in spite of a removal efficacy this high, relatively large numbers of worms were present in this and other treated calves at necropsy. Limited data are suggestive of a selective action by the drug on the female worms.—[*S. E. Leland, Jr., J. H. Drudge, Z. N. Wyant, G. W. Elam, and L. B. Hutzler: Studies on Trichostrongylus axei (Cobbold, 1879). IV. Some Aspects of Treatment, Pathogenicity, and Quantification in Experimental Infections of a Horse Strain in Calves. Am. J. Vet. Res., 20, (Sept., 1959): 787-794.*]

Renal Function Test in Ewes

Phenolsulfonphthalein (PSP) was administered intravenously to 6 ewes. Clinical observations, blood and urine studies, gross and histopathologic examination of the kidneys and liver indicated these animals were essentially normal. Urine and blood collections were made simultaneously.

The standard PSP excretion test showed that the average 30-minute excretion of PSP in the urine was 56 per cent and the average 60-minute excretion was 67 per cent. The results of the PSP excretion tests confirmed the clinical and pathologic results which had indicated the sheep had unimpaired kidney function.

Plasma from the sheep was analyzed by a modification of the urine method. The average $-b_2$ value, defined as the fractional part of the volume of distribution (as represented by blood plasma) which is cleared of dye per minute on an instan-

taneous basis, is almost identical for cattle (0.0298) and sheep (0.0300).

A comparison of calculated PSP excretion, based on plasma loss of dye, with appearance of PSP in the urine, indicated the plasma loss of dye was higher than the actual excretion. A statistical analysis of the slopes of urine excretion versus time on plasma loss of dye versus time gave a regression coefficient of b=0.005 ± 0.198. Additional investigation is needed to establish more clearly the validity of PSP disappearance from plasma as a method of measuring kidney function in the sheep. —*[J. P. Manning, E. F. Reber, O. P. Malhotra, P. D. Beamer, L. E. Boley, and H. W. Norton: Phenolsulfonphthalein Clearance as a Measure of Renal Function in Ewes. Am. J. Vet. Res., 20, (Sept., 1959): 858-862.]*

Staphylococci Associated with Bovine Udders

An examination was made of the physiologic characters of strains of *Staphylococcus aureus* from cases of acute mastitis (15 cultures), chronic mastitis (29 cultures), and from normal udders (26 cultures). There was no significant difference between the cultures obtained from normal udders and those with chronic mastitis, although normal udders showed slightly less biochemical activity. However, the strains isolated from udders with acute mastitis were more frequently pigmented and had, as a rule, a higher capacity for peptonization of milk and lipolytic changes than the strains from normal udders or those with chronic mastitis. Moreover, 73.3 per cent of the cultures from udders with acute mastitis produced opacity in egg-yolk medium, compared with 6.9 per cent of the cultures from udders with chronic mastitis and 7.7 per cent of those from normal udders.

All the cultures from udders with acute mastitis and all those which were egg-yolk positive produced *alpha*-lysin, but in no greater quantities than did the other *alpha*-lysin-producing strains. The cultures from udders with acute mastitis showed the greatest sensitivity to phage lysis, but no particular phage group was of more frequent occurrence in the acute positive strains than in those from the other sources. The egg-yolk positive strains showed a greater sensitivity to the phage types of group I than did the egg-yolk negative strains. This investigation shows that the strains of *Staph. aureus* associated with the bovine udder can be differentiated into two types: (1) the egg-yolk positive type, which is associated with the acute form of the disease, and (2) the egg-yolk negative type, which is found in udders with chronic mastitis or in normal udders.—*[W. B. Reid and J. B. Wilson: A Study of the Staphylococci Associated with the Bovine Udder. Am. J. Vet. Res., 20, (Sept., 1959): 825-831.]*

Achondroplastic Dwarfism in Cattle

Projections of the wing of the orbitosphenoid and posterior intraoccipital synchondrosis were observed when the heads of 144 cattle necropsied for the study of dwarfism were sagittally sectioned. The incidence and severity of projections were greatest in the achondroplastic group, intermediate in the local and partial achondroplastic group, and lowest in the nonachondroplastic group. An explanation of the development of these projections which involves arrested development and differential growth rates due to achondroplasia was proposed.—*[Walter S. Tyler, Logan M. Julian, Larry S. McFarland, Howard E. Evans, and Paul W. Gregory: Two Projections into the Cranial Cavity Associated with Achondroplastic Dwarfism in Cattle. Am. J. Vet. Res., 20, (July, 1959): 702-707.]*

Treatment of Salmonellosis in Turkey Poults

Death losses in experimental *Salmonella gallinarum* infected 10-day-old poults were prevented by feeding chloramphenicol (0.22%) or furazolidone (0.011% or 0.022%) in feed, starting five days before infection. When medication was started four days after infection, more furazolidone- than chloramphenicol-medicated birds survived. Agglutination tests were negative in many survivors medicated with furazolidone.—*[Dale J. Richey and Charles L. Morgan: The Treatment of Salmonella gallinarum Infection in Turkey Poults with Chloramphenicol and Furazolidone. Am. J. Vet. Res., 20, (July, 1959): 659-661.]*

Experimental Ornithosis in Herons and Egrets

Herons and egrets were experimentally infected intratracheally with a turkey strain of ornithosis. The birds remained apparently normal and developed a serologic titer as indicated by the indirect complement fixation test. Virus was obtained from cloacal swabs for as long as 67 days postinoculation.—*[R. W. Moore, J. R. Watkins, and J. R. Dixon: Experimental Ornithosis in Herons and Egrets. Am. J. Vet. Res., 20, (Sept., 1959): 884-886.]*

Foreign Abstracts

Listeriosis of Sheep and Goats

The author gives a detailed description of the clinical picture, based on observation of the natural infection in 48 sheep and 19 goats, and experimental infection in 25 lambs and 10 goats.

The blood picture was marked by an increase in neutrophils with a shift to the left. Usually the differential count returned to normal on the fifth to seventh day. No lymphocytosis or monocytosis was seen.

Twelve animals were treated with bovine antiserum. Two doses of 10 to 20 ml. were given, one or two days apart. Four animals died and the rest recovered in 15 to 25 days.

Seven animals treated in the early stages or in the septicemic form of the disease, and not showing nervous disorders, were given a total of 750,000 to 1,200,000 units of depot penicillin intra-

muscularly in 3 or 4 doses. They were also given a total of 4.5 to 6.0 ml. of vitamin B_1 intravenously in 0.5 per cent solution. Three died.

Nine animals showing nervous signs were given the same dosage of penicillin intramuscularly and, in 3 or 4 doses, a total of 20 to 40 ml. of a mixture of 1 per cent procaine and 10 per cent sodium bromide intravenously. One died.—[*M. M. Khalimbekov, Azerbaidzhan Veterinary and Zootechnical Res. Inst.: The Clinical Picture and Treatment of Listeriosis of Sheep and Goats. Veterinariya, 36, (April, 1959): 37-41.*]—ROBERT E. HABEL.

Antibiotics and Atrophic Rhinitis

The Soviet antibiotic, biomycin, was used in these experiments. It is described as a crystalline hydrochloride manufactured from the culture fluid of *Actinomyces* (*Streptomyces*) *aureofaciens*.

Pigs 5 to 16 days old at the beginning of the experiment were given a solution of biomycin by mouth, six times each week for 45 days. The dose was increased with the age of the pigs from 4,000 units to 16,000 units. After 45 days, 6 of the 66 experimental pigs showed mild signs of atrophic rhinitis, while 25 of the 46 controls showed marked atrophic rhinitis. The average weight of the pigs in the experimental group was 1,430 Gm. more than that of the controls at the end of the experiment. Five pigs in the control group turned out to be runts; there were none in the treated group.

The experiment was repeated with 116 pigs. Atrophic rhinitis was seen in 8.5 per cent of the treated pigs and in 52 per cent of the control pigs. —[*J. A. Afanasov, Chechen-Ingush Vet. Res. Sta.: The Action of Biomycin in Infectious Atrophic Rhinitis of Swine. Veterinariya, 36, (April, 1959): 64.*]—ROBERT E. HABEL.

Books and Reports

Bibliography of the Dog

The stated objectives of this book are: (1) to gather into one volume literature about the dog from 1,500 books and journals; (2) to make available to medical and laboratory workers current references to naturally occurring diseases of the dog; (3) to make available to veterinarians the current or recent literature in advanced physiologic and pathologic studies about dogs; (4) to prevent repetitious experiments which consume time, money, and animals; (5) to bring into more common veterinary therapeutic use the techniques of surgery and physiology that have been perfected in experimental procedures; (6) to better prepare veterinarians who are consulted by other professions on the possible use of dogs as experimental material; (7) to collect literature about one animal and subject index same, so as to cross-section biological literature.

From 1,500 books and journals, there are over 2,000 references, listed alphabetically by author and cross indexed by subject. Some of the material covered is from the nineteenth century. The author admits that there are "gaps in the picture," but a brief survey of different subject matters indicates that the omissions outnumber the included papers. A review of the reference lists, of some of the reports about dogs, highlights the deficiencies even more. Many of us would expect that the number of research reports involving the dog would probably be many times 12,000.

It is doubtful that use of this book will save "weeks of plodding work," except in a very few cases. First, the topics even about the dog, are seriously incomplete. Second, many research projects of a fundamental nature involve more than one animal.

The *clinical* references to the dog are more complete, and in this area the bibliography may be of greater value. It would have added greatly to the authority of the presentation to have listed the journals covered.—[*Bibliography of the Dog. By Marcus M. Mason. 401 pages. Iowa State University Press, Ames, Iowa. 1959. Price $6.00.*]—N. R. BREWER.

Books Received

The following books have recently been added to the veterinary literature in Germany:

Pathology and Therapeutics of the Diseases of Domestic Animals (Spezielle Pathologie und Therapie der Haustiere). By R. Manninger and J. Mocsy. Two volumes. 1,960 pages, 764 illustrations. G. Fischer, Jena, Villengang 2, Germany. 1959. Price about $31.00.

Distinguishing Marks of the Horse (Die Kennzeichen des Pferdes). By M. Schiller. 48 pages, 117 illustrations. G. Fischer, Jena, Villengang 2, Germany. 1959. Price about $1.40.

Origin and Prevention of Food Contamination by Salmonella Bacterium (Entstehung und Verhütung von Lebensmittelvergiftungen durch Salmonellabakterien). By H. Dräger. 98 pages. G. Fischer, Jena, Villengang 2, Germany. 1958. Price about $1.40.

THE NEWS

Veterinarians Awarded Advanced Degrees

The following listing contains the advanced degrees awarded veterinarians during the 1958-1959 academic year as well as some miscellaneous degrees not previously reported to us during 1957-1958:

AWARDED MASTER OF SCIENCE (M.S.) DEGREE

Name of student	Title of thesis	Major professor	Dept. and School	Date granted
W. A. Aanes D.V.M.	Pingue (Hymenoxys richardsonni) Poisoning in Sheep	A. W. Deem	Dept. of Pathol. and Bacteriology College of Vet. Med. Colo. State Univ.	June, 1959
Arthur Lawrence Aronson B.S. D.V.M.	Pharmacological Studies on the Addictive Analgesics and Their Antagonists in the Dog	H. H. Dukes	Dept. of Physiol. N.Y. State Vet. College Cornell Univ.	February, 1959
Clifford C. Beck B.S. D.V.M.	The Role of Mycosis in Veterinary Medicine with Special Reference to Candida tropicalis as the Etiological Agent of Bovine Mycotic Mastitis	G. H. Conner	Dept. of Surgery and Med. College of Vet. Med. Michigan State Univ.	June, 1959
William J. Benton D.V.M.	Studies on the Transmission of Infectious Synovitis in Chickens	M. S. Cover	Dept. of Animal and Poultry Ind. Univ. of Del.	June, 1959
George Talmadge Blackledge B.S. D.V.M.	Semen Production and Reserves of Dogs under Two Management and Nutritional Regimes	E. P. Leonard	Dept. of Therapeutics and Small Animal Diseases N.Y. State Vet. College Cornell Univ.	September, 1958
Gerald Borman V.M.D.	The Trigeminal and Facial Nerves as Pathways of Infection of Sheep with Listeriosis	Carl Olson	Dept. of Vet. Sci. College of Agric. Univ. of Wis.	August, 1959
Clyde I. Boyer D.V.M.	Serological Tests for Ornithosis in Turkeys	L. C. Grumbles	Dept. of Vet. Microbiology School of Vet. Med. A.&M. College of Texas	August, 1959
Carroll L. Burke D.V.M.	Avian Enteric Cytopathogenic Viruses	E. L. Jungherr	Dept. of Animal Diseases Univ. of Conn.	June, 1959
Edward T. Braye D.V.M.	Studies of Bovine Peritoneal Fluid	G. H. Conner	Dept. of Surgery and Med. College of Vet. Med. Michigan State Univ.	June, 1959
S. G. Campbell B.V.M.	A Study of Hemolytic Escherichia coli Strains Isolated from Swine	D. A. Barnum	Dept. of Pathol. and Bacteriology Ontario Vet. College Univ. of Toronto	May, 1959
Richard Ross Chalquest B.S. D.V.M.	Studies on the Survival of Pleuropneumonia-like Organisms (PPLO) in Experimentally Infected Hatching Eggs that Were Dipped in Antibiotic Solutions	P. P. Levine	Dept. of Pathol. and Bacteriology N.Y. State Vet. College Cornell Univ.	February, 1959
Jamie Neal Chastain D.V.M.	Surgical Technique, Using Skin, for Repair of Simultaneously Ruptured Anterior Cruciate and Medial Collateral Ligaments of the Canine Femorotibial Articulation	W. C. Banks	Dept. of Vet. Med. and Surgery School of Vet. Med. A.&M. College of Texas	January, 1959
Emerson D. Colby* A.B.	Liver Function in Eck Fistula Dogs	R. F. Johnston	Dept. of Physiol. and Pharmacology College of Vet. Med. Mich. State Univ.	June, 1959

*Emerson D. Colby is a veterinary student who entered the College of Veterinary Medicine with an A.B. degree and has earned his M. S. degree while pursuing the professional curriculum. He will receive his D.V.M. degree in 1962.

AWARDED MASTER OF SCIENCE (M.S.) DEGREE—*Continued*

Name of student	Title of thesis	Major professor	Dept. and School	Date granted
Mohammed Ishak Djofor D.V.M.	Blood Picture Studies in Calves Infected with Lungworms (Dictyocaulus viviparus—Bloch)	L. E. Swanson	Dept. of Vet. Sci. College of Agric. University of Fla.	August, 1958
Makendra Kumar Doshi Vet. Degree (India)	A Comparison of the Tube Test with the Rapid Slide Test for the Determination of Coagulase Production by Staphylococci Originating from Bovine Udder	John H. Helwig	Dept. of Vet. Preventive Med. College of Vet. Med. Ohio State Univ.	March, 1959
Frank N. Dost D.V.M.	Glucose and Ascorbic Acid Content of Blood and Tissues of Normal and Insulin Injected Rabbits	G. K. L. Underbjerg	Dept. of Physiology School of Vet. Med. Kansas State Univ.	May, 1959
R. T. DuBose B.S. D.V.M.	The Identification and Characterization of a Virus Isolated from Bobwhite Quail with a Respiratory Disease	J. P. Delaplane and L. C. Grumbles	Dept. of Vet. Microbiology School of Vet. Med. A. & M. College of Texas	August, 1958
Sukanta D. Dutta B.V.Sc.	.....	.....	College of Vet. Med. Univ. of Minn.	August, 1959
Saradindu Dutta B.V.S.	Relationship of Stress in Shipping Fever of Cattle	R. E. Nichols	Dept. of Vet. Sci. College of Agric. Univ. of Wis.	June, 1959
Thomas M. Ford B.S. D.V.M.	An Evaluation of Three Antiseptics Used in the Presurgical Preparation of Patients at the Michigan State University Vet. Clinic	A. R. Drury	Dept. of Surgery and Med. College of Vet. Med. Mich. State Univ.	June, 1959
Jonathan D. Friend D.V.M.	The Comparative Anatomy of Coxofemoral Articulation of the Dog, Ox, and Horse	D. M. Trotter	Dept. of Anatomy School of Vet. Med. Kansas State Univ.	August, 1959
L. S. Geib D.V.M.	Definition of "Mulberry Heart Disease" of Swine and Investigation of Cause	K. V. Jubb	Dept. of Pathol. and Bacteriology Ontario Vet. College Univ. of Toronto	May, 1959
John P. Gibson D.V.M.	A Study of the Symbiotic Relationship of Hog Cholera Virus to Eperythrozoon suis Infection	M. J. Twiehaus	Dept. of Pathology School of Vet. Med. Kansas State Univ.	August, 1959
David Brendan Glazier M.V.B. M.R.C.V.S.	A Study of the Electrocardiogram of the Horse	H. H. Dukes	Dept. of Physiology N.Y. State Vet. College Cornell Univ.	September, 1958
Hemendra Kumar Gohain B.V.S.	Immunological Studies of Staphylococcal Toxins in Cattle	D. T. Berman	Dept. of Vet. Sci. College of Agric. Univ. of Wis.	August, 1959
Charles F. Hall B.S. D.V.M.	Clinical and Pathological Manifestations of Zinc Deficiency and Zinc Toxicity in Growing Chickens	C. C. Morrill	Dept. of Vet. Pathol. College of Vet. Med. Mich. State Univ.	June, 1959
Howard A. Hartman B.S. D.V.M.	Histopathological Changes in Experimental Magnesium Deficiency of Calves	C. C. Morrill	Dept. of Vet. Pathol. College of Vet. Med. Mich. State Univ.	June, 1959
R. A. Herin D.V.M.	Thermoregulatory Effects of the Abdominal Air Sac on Spermatogenesis in Domestic Fowl	N. H. Booth	Dept. of Physiology College of Vet. Med. Colo. State Univ.	1959
Howard Philip Hobson B.S. D.V.M.	Angiocardiography in the Dirofilaria immitis Positive Canine	B. F. Hoerlein	Dept. of Small Animal Surgery and Med. School of Vet. Med. Ala. Polytechnic Institute	December, 1958
James C. Hruska D.V.M.	A Study of Experimental Lathyrism in Baby Pigs	C. K. Whitehair	Dept. of Vet. Pathol. College of Vet. Med. Mich. State Univ.	June, 1959
John Landis Hyde A.B. D.V.M.	The Effects of the Local Application of a Hyperkeratotic Chemical on Morphology of the Bovine Teat Canal and Susceptibility to Swab Exposures with Streptococcus agalactiae	J. M. Murphy	Dept. of Med. and Obstetrics N.Y. State Vet. College Cornell Univ.	June, 1959
M. Sayed Jeoffery B.V.S.	Nutritional Factors Influencing Experimental Candida albicans Infection in Chickens	S. G. Kenzy	Dept. of Clinical Med. & Surgery College of Vet. Med. Wash. State Univ.	August, 1959

AWARDED MASTER OF SCIENCE (M.S.) DEGREE—*Continued*

Name of student	Title of thesis	Major professor	Dept. and School	Date granted
Saroj K. Jha G.B.V.C.	Some Effects of Triflupromazine Hydrochloride in Goats	W. V. Lumb	Dept. of Surgery and Med. College of Vet. Med. Mich. State Univ.	June, 1959
Edward L. Johnson D.V.M.	A Study of the Effect of Sulfathiazole on the Normal Bovine Kidney	H. A. Smith	Dept. of Vet. Pathology School of Vet. Med. A. & M. College of Texas	July, 1959
Paul F. Jungerman D.V.M.	Salmonella Organisms in Mature Healthy Dogs	L. C. Grumbles	Dept. of Vet. Microbiology School of Vet. Med. A. & M. College of Texas	August, 1959
Muhammad Tufail Khan B.V.S.	A Serological Study of Canine Infectious Hepatitis	R. L. Ott	Dept. of Clinical Med. & Surgery College of Vet. Med. Wash. State Univ.	February, 1959
Julius Peter Kreier V.M.D.	The Physiological Actions of Vitamin E and Autoxidized Tallow in Rats	E F. Reber	Dept. of Vet. Med. Sci. College of Vet. Med. Univ. of Ill.	June, 1959
Lloyd Lauerman D.V.M.	The Etiology of Urinary Tract Infection in Ranch Mink	D. T. Berman	Dept. of Vet. Sci. College of Agric. Univ. of Wis.	August, 1959
Paul Rudolf Lindenmaier B.S. D.V.M.	The Taste End-Organs of the Chicken	Morley Kare	Dept. of Physiol. N.Y. State Vet. College Cornell Univ.	June, 1959
Donald Robert Lingard D.V.M.	The Endometrial Flora and Histopathology of Infertile Cattle	P. D. Beamer	Dept. of Vet. Med. Science College of Vet. Med. Univ. of Ill.	June, 1959
Demetrice I. Lyles D.V.M.	The Morphology and Periodicity of Microfilariae in Dogs	F. R. Koutz	Dept. of Vet. Parasitology College of Vet. Med. Ohio State Univ.	August, 1958
Frederich T. Lynd B.S. D.V.M.	Possible Causes of Reddish Discoloration of Urine ("Red Water") as it Involves Cattle	H. A. Smith	Dept. of Vet. Pathology School of Vet. Med. A. & M. College of Texas	May, 1959
John Patrick Manning D.V.M.	Phenosulfonephthalein Clearance As a Measure or Renal Function in Ewes	L. E. Boley	Dept. of Vet. Med. Sci. College of Vet. Med. Univ. of Ill.	August, 1958
Dandi Mariappa B.V.Sc.	The Histology of the Bovine Liver with Special Reference to the Formation of Bile Canaliculi	D. S. Folse	Dept. of Pathology School of Vet. Med. Kansas State Univ.	August, 1959
P. D. Mathur Vet. Degree (India)	Present Knowledge of Rabies and Its Application to the Control of This Disease in Rajasthan (India)	John H. Helwig	Dept. of Vet. Preventive Medicine College of Vet. Med. Ohio State Univ.	March, 1959
Lois S. McDaniel D.V.M.	Enzyme Activity of Chicken Plasma During Health and Disease	H. L. Chute	Dept. of Bacteriology School of Agric. University of Maine	August, 1959
John S. McDonald A. B. D.V.M.	A Morphological Study of the Ovaries in Pregnant Dairy Cows	K. R. Johnson	Dept. of Dairy Sci. College of Agric. Univ. of Idaho	June, 1959
Walter F. Mestanza B.S. D.V.M.	Arsanilic Acid Toxicity in Calves	James R. Rooney, II	Dept. of Animal Pathology Virginia Polytechnic Institute	June, 1959
Roy J. Milleret D.V.M.	The Effects of an Organic Phosphate Compound (Bayer 21/199) on the Semen Quality of Bulls	M. J. Twiehaus	Dept. of Pathology School of Vet. Med. Kansas State Univ.	August, 1959
Frank Edward Mitchell D.V.M.	Incidence of Lyssa in One Hundred Cats Submitted for Rabies Examination	Wm. S. Monlux	Dept. of Vet. Pathology College of Vet. Med. Iowa State Univ.	November, 1958
Philip W. Murdick D.V.M.	Effect of Hypothyroidism on the Semen Characteristics of the Dog	Harold E. Amstutz	Dept. of Vet. Med. College of Vet. Med. Ohio State Univ.	March, 1959

AWARDED MASTER OF SCIENCE (M.S.) DEGREE—*Continued*

Name of student	Title of thesis	Major professor	Dept. and School	Date granted
Gadde S. Murti B.V.Sc.	Immunological Response of Leptospira pomona Bacterin in Laboratory Animals	M. J. Twiehaus	Dept. of Pathology School of Vet. Med. Kansas State Univ.	May, 1959
Walter Loy Myers B.S. D.V.M.	.....	J. O. Alberts	Dept. of Vet. Med. Sci. College of Vet. Med. Univ. of Ill.	June, 1959
Dallas Leroy Nelson D.V.M.	Studies of the Moraxella bovis Organism	M. J. Twiehaus	Dept. of Pathology School of Vet. Med. Kansas State Univ.	January, 1959
J. Nelson M.R.C.V.S.	Vitamin Deficiency Neuropathics in Cats	K. V. Jubb	Dept. of Pathol. and Bacteriology Ontario Vet. College Univ. of Toronto	May, 1959
Stuart L. Nelson D.V.M.	Pneumonia of Swine	A. L. Delez	Dept. of Vet. Sci. School of Vet. Sci. & Med. Purdue Univ.	January, 1959
Joaquim Martins Ferreira Neto D.V.M.	The Value of Some Liver Function Tests in Dogs	John Bentinck-Smith	Dept. of Pathol. and Bacteriology N.Y. State Vet. College Cornell Univ.	September, 1958
Dean Irwin Newton B.S. D.V.M.	Effect of Cortisone on the Pathogenesis of Duck Hepatitis Virus in Chicken Embryos and Ducks	R. P. Link	Dept. of Vet. Med. Sci. College of Vet. Med. Univ. of Ill.	June, 1959
B. J. Payne D.V.M.	The Recognition of Certain Helminth Parasites in Tissue Sections	H. A. Smith	Dept. of Vet. Pathology School of Vet. Med. A. & M. College of Texas	Requirements completed Sept. 1959, degree at next granting time.
Duane R. Peterson D.V.M.	Radicular Origin of the Nerves of the Lumbosacral Plexus of the Bos taurus	D. M. Trotter	Dept. of Anatomy School of Vet. Med. Kansas State Univ.	May, 1959
Jesse Ronald Pickard B.S. D.V.M.	Effects of Fluorosis on Developing Bovine Incisor Teeth	L. E. St. Clair	Dept. of Vet. Med. Sci. College of Vet. Med. Univ. of Ill.	October, 1958
B. Portway B.V.Sc.	Superovulation and Transplantation of Ova in the Domestic Goat	C. A. V. Barker	Dept. of Med. & Surgery Ontario Vet. College Univ. of Toronto	May, 1959
R. Srinivas Raghavan B.V.Sc.	Trypanosomiasis in Cattle	F. H. Oberst	Dept. of Surgery and Medicine School of Vet. Med. Kansas State Univ.	May, 1959
Ummettala Ramkrishnanand Rao B.V.S. M.S.	.....	P. D. Beamer	Dept. of Vet. Med. Sci. College of Vet. Med. Univ. of Ill.	June, 1959
Velisetti P. Rao B.V.Sc.	Studies on the Nerve Endings of the External Gentalia of the Bovine	D. S. Folse	Dept. of Pathology School of Vet. Med. Kansas State Univ.	August, 1959
Sohan S. Rathor B.V.S.	Tissue Transplants for Repair of Canine Anterior Cruciate Ligament	W. V. Lumb	Dept. of Surgery and Med. College of Vet. Med. Mich. State Univ.	June, 1959
Richard S. Ray A.B. D.V.M.	Serum Transaminase Changes of Several Domestic Animals Under Selected Conditions	Charles R. Smith	Dept. of Vet Physiology and Pharmacology College of Vet. Med. Ohio State Univ.	August, 1958
Vatti Rayapareddy B.V.Sc.	A Survey of Urinary Calculi and the Associated Surgical Problems of Urogenital System of the Male Bovine	E. R. Frank	Dept. of Surgery and Medicine School of Vet. Med. Kansas State Univ.	May, 1959
Gerald Dean Rousseau D.V.M.	The Relationship of Certain Nutritional Stress Factors to Parakeratosis of Swine	G. K. L. Underbjerg	Dept. of Physiology School of Vet. Med. Kansas State Univ.	January, 1959
Bibeka Nanda Sahoo B.V.S.	.....	Cecil Elder	Dept. of Vet. Pathol. School of Vet. Med. Univ. of Missouri	August, 1959

AWARDED MASTER OF SCIENCE (M.S.) DEGREE—*Continued*

Name of student	Title of thesis	Major professor	Dept. and School	Date granted
Ganti A. Sastry B.Vsc.	A Survey of Animal Neoplasms	M. J. Twiehaus	Dept. of Pathology School of Vet. Med. Kansas State Univ.	January, 1959
Sohan Prasad Saxena B.S. Diploma, Bombay Veterinary College	Lysogeny in Pasteurella	A. B. Hoerlein	Dept. of Vet. Med. Sci. College of Vet. Med. Univ. of Ill.	February, 1959
Robert Lee Schricker D.V.M.	The Effect of Cortisone on Leptospira pomona infection in the Guinea Pig	J. O. Alberts	Dept. of Vet. Med. Sci. College of Vet. Med. Univ. of Ill.	October, 1958
Robert P. Shields D.V.M.	A Comparison of Serum and Bone Alkaline Phosphatase Activity of Normal Dogs to that of Dogs With Hypertrophic Pulmonary Osteoarthropathy	C. H. Clark	Dept. of Physiol. & Pharmacology School of Vet. Med. Ala. Polytechnic Institute	August, 1959
Vadlamudi Shrikrishna B.V.S.	Comparative Study of the Virus Neutralization Test for Vesicular Stomatitis in Chicken Embryos and Tissue Cultures	R. P. Hanson	Dept. of Vet. Sci. College of Agric. Univ. of Wis.	June, 1959
Karam Ver Singh D.V.M.	Study of Porcine Enteroviruses by the Plaque Technique	Edward H. Bohl	Dept. of Bacteriology College of Vet. Med. Ohio State Univ.	December, 1958
Stuart D. Sleight D.V.M.	Experimental Leptospirosis: The Early Pathogenesis of Leptospira Infection in Young Swine	C. C. Morrill	Dept. of Vet. Pathol. College of Vet. Med. Mich. State Univ.	June, 1959
Dean Harley Smith B.S. D.V.M.	The Incidence of Leptospira Agglutinins in Sera of Oregon Swine	L. R. Vawter	Dept. of Vet. Med. Oregon State College	June, 1959
Albert Charles Strafuss B.S. D.V.M.	A Central Nervous System Reaction to Disturbances in Ruminant Digestion	Wm. S. Monlux	Dept. of Vet. Pathol. College of Vet. Med. Iowa State Univ.	November, 1958
James H. Strickland D.V.M. B.S.	The Microscopic Anatomy of the Skin and External Ear of Felis Domesticus	Lois M. Calhoun	Dept. of Anatomy College of Vet. Med. Mich. State Univ.	December, 1958
Gilberto S. Trevino D.V.M.	Certain Basic Surgical Principles of Full-Thickness Free Skin Grafts in the Dog	W. C. Banks	Dept. of Vet. Med. and Surgery School of Vet. Med. A. & M. College of Texas	January, 1959
Leon W. Turner D.V.M.	Experimental Leptospirosis in the Chinchilla (Chinchilla laniger)	W. E. Ribelin	Dept. of Pathology and Parasitology School of Vet. Med. Ala. Polytechnic Institute	August, 1957
Rajpal S. Tyagi B.V.S.	Uterine Healing After Cesarean Section in Goats	W. V. Lumb	Dept. of Surgery and Med. College of Vet. Med. Mich. State Univ.	June, 1959
Glenn L. Waxler D.V.M. M.S.	The Influence of Some Nutritional Factors on Experimental Hog Cholera Infection	C. K. Whitehair	Dept. of Vet. Pathol. College of Vet. Med. Mich. State Univ.	March, 1959
Howard S. Wilcox D.V.M.	Removal of Dirofilaris immitis by Pulmonary Arteriotomy of the Dog	B. F. Hoerlein	Dept. Small Animal Surgery and Med. School of Vet. Med. Ala. Polytechnic Institute	June, 1959
George P. Wilson, III V.M.D.	A Study of Experimentally produced Peptic Esophageal Ulcers in the Dog	Richard L. Rudy	Dept. of Vet. Surgery College of Vet. Med. Ohio State Univ.	June, 1959
Charles Hunter Woodley D.V.M.	The Effects of Transfusion Methods and Donor Age on the Life Span of Red Blood Cells in Young Dogs	C. H. Clark	Dept. of Physiol. and Pharmacology School of Vet. Med. Ala. Polytechnic Institute	June, 1959

AWARDED DOCTOR OF PHILOSOPHY (Ph.D.) DEGREE

Name of student	Title of thesis	Major professor	Dept. and School	Date granted
Ralph C. Belding D.V.M. M.Sc.	Studies on Lymphomatosis in Turkeys	W. D. Pounden	Dept. of Preventive Med. College of Vet. Med. Ohio State Univ.	December, 1958

AWARDED DOCTOR OF PHILOSOPHY (Ph.D.) DEGREE—*Continued*

Name of student	Title of thesis	Major professor	Dept. and School	Date granted
Emmett N. Bergman B.S. D.V.M. M.S.	Metabolic Studies on Hypoglycemic Ketosis in Pregnant Guinea Pigs	.....	College of Veterinary Medicine University of Minn.	March, 1959
Hans Blobel D.V.M. M.S.	Experimental Studies on Staphylococcal Coagulase	D. T. Berman	Dept. of Vet. Sci. College of Agric. Univ. of Wis.	January, 1959
Howard Edward Bond B.S. D.V.M.	A Study on the Pathogenesis of Acute Acid Indigestion in the Sheep	H. H. Dukes	Dept. of Physiology N. Y. State Vet. College Cornell Univ.	June, 1959
John Gilbert Bowne B.S. D.V.M. M.S.	Neuroanatomy of the Brachial Plexus of the Dog	Robert Getty	Dept. of Vet. Anatomy College of Vet. Med. Iowa State Univ.	May, 1959
Robert F.Borgman D.V.M.	Avitaminosis E Nutritional Muscular Dystrophy in Relation to Induced Stresses	G. K. L. Underbjerg	Dept. of Physiology School of Vet. Med. Kansas State Univ.	May, 1959
Leland Eugene Carmichael A.B. D.V.M.	Studies on Canine Hepatitis	D. W. Bruner	Dept. of Pathol. and Bacteriology N. Y. State Vet. College Cornell Univ.	June, 1959
Donald Roy Casorso B.S.A. M.S.A. D.V.M. V.S.	The Response of the Developing Chicken Embryo to Certain Avian Pathogens	E. L. Jungherr	Dept. of Animal Diseases Univ. of Conn.	June, 1959
Donald H. Clifford D.V.M. M.P.H.	Effect of Preanesthetic Medication on Barbiturate Anesthesia Hypothermia Traumatic Shock and Lethal Dose of Pentobarbital in the Feline Species	.....	College of Veterinary Medicine University of Minn.	June, 1959
Phillip Coleman D.V.M. M.S.	Studies of the Antigenic Nature of the Myxoviruses	R. P. Hanson	Dept. of Vet. Sci. College of Agric. Univ. of Wis.	August, 1959
Richard A. Griesemer D.V.M.	Bovine Papular Stomatitis	C. R. Cole	Dept. of Vet. Pathology College of Vet. Med. Ohio State Univ.	March, 1959
Edward O. Haelterman D.V.M. M.S.	Studies of Transmissible Gastroenteritis of Swine	L. M. Hutchings	Dept. of Vet. Sci. School of Vet. Sci. & Med. Purdue Univ.	January, 1959
Jiro Jerry Kaneko A.B. D.V.M.	The Incorporation of Norleucine into Casein by the Intact Dairy Cow	A. L. Black and Max Kleiber	School of Vet. Med. Univ. of Calif.	January, 1959
Adalbert Koestner D.V.M. M.Sc.	Neuropathology of Ovine, Bovine, Porcine, and Feline Toxoplasmosis	C. R. Cole	Dept. of Vet. Pathology College of Vet. Med. Ohio State Univ.	June, 1959
David Schultz Kronfeld B.V.Sc. B.Sc. M.V.Sc.	Acetate Metabolism in Bovine Ketosis	Max Kleiber	School of Vet. Med. Univ. of Calif.	June, 1959
Keith I. Loken B.S. D.V.M.	Infection of the Bovine Mammary Gland with Staphylococci	.....	College of Veterinary Medicine University of Minn.	June, 1959
William Medway B.S. D.V.M.	Water Metabolism in the Growing Domestic Fowl	Morley R. Kare	Dept. of Physiology N.Y. State Vet. College Cornell Univ.	September, 1958
Svend W. Neilsen D.V.M. M.Sc.	Canine Oncology	C. R. Cole	Dept. of Vet. Pathology College of Vet. Med. Ohio State Univ.	June, 1959
Yoshihiro Ozawa A.B. M.S.	Some Properties of Infectious Bronchitis Virus Propagated in the Isolated Chorioallantoic Membrane	C. H. Cunningham	Dept. of Microbiology and Pub. Health College of Vet. Med. Mich. State Univ.	June, 1959

AWARDED DOCTOR OF PHILOSOPHY (Ph.D.) DEGREE—*Continued*

Name of student	Title of thesis	Major professor	Dept. and School	Date granted
Miodrag Ristic D.V.M. M.S.	Agglutination and Lysis Tests with Erythrocytes Adsorbed with a Fraction of Vibrio fetus	C. A. Brandly	Dept. of Vet. Med. Sci. College of Vet. Med. Univ. of Ill.	June, 1959
Robert M. Schwartzman V.M.D.	Clinico-Pathological Study of Small Animal Dermatoses	.....	College of Veterinary Medicine University of Minn.	June, 1959
Padmanabha Subramanyam B.V.S.	The Isolation and Characterization of Two Isolates of a Previously Unrecognized Enterovirus of Chickens	.....	College of Veterinary Medicine University of Minn.	July, 1959
Daniel Naphtali Tapper B.S. V.M.D.	Two Studies in Avian Physiology. I. The Distribution of Glucose in the Blood of the Domestic Fowl. II. Epinephrine-Induced Hemoconcentration in the Domestic Fowl	H. H. Dukes	Dept. of Physiology N.Y. State Vet. College Cornell Univ.	June, 1959
Alex Winter D.V.M. M.S.	Studies on the Pathologic Physiology of the Uterus: The Uterine Response to Experimental Infection and the Effect on Pregnancy of Parenteral Injections of Embryo Brei	S. H. McNutt	Dept. of Vet. Sci. College of Agric. Univ. of Wis.	June, 1959

AWARDED PUBLIC HEALTH DEGREE

Name of student	Degree received	Title of thesis	Major professor	Dept. and School	Date granted
Eduardo Buitrago Garcia D.V.M.	M.P.H.†	Developments in the Production and Standardization of Tuberculin	Cornelia Eddy	Dept. of Tropical Med. and Public Health School of Medicine Tulane University	June, 1959
Earl Joseph Catcott D.V.M.	M.P.H.	.....	.....	Harvard School of Public Health	June, 1959
Charles Van Loan Elia D.V.M.	M.P.H.	.....	B. F. Chow	School of Hyg. and Pub. Health The Johns Hopkins Univ.	June, 1959
Nathan B. Gale A.B. D.V.M.	M.P.H.	Rabies in Bats, a Comprehensive Study of the Literature	H. Gelfand	Dept. of Tropical Med. and Public Health School of Medicine Tulane University	June, 1959
Dr. C. A. Grégoire M.V.	D.V.P.H.‡	Mastitis in Dairy Cows	M. Panisset	School of Hygiene Univ. of Montreal	Fall, 1959
Joe R. Held A.A. B.S. D.V.M.	M.P.H.	Tinea of the Glabrous Skin—Experimental Studies Related to the Mode of Infection with a Critical Review of the Literature	L. Friedman	Dept. of Tropical Med. and Public Health School of Medicine Tulane University	June, 1959
Ralph Jenner B.S. D.V.M.	M.P.H.	.....	.....	School of Public Health Univ. of Mich.	June, 1959
Charles E. Kendall D.V.M.	M.P.H.	.....	Horace M. Gezon	Dept. of Epidemiology and Microbiology School of Public Health Univ. of Pittsburgh	June, 1959
Herbert V. Lundy B.S. D.V.M.	M.P.H.	Experimental Infection of Laboratory Animals with the Dog Whipworm and a Review of the Literature and its Relation to human disease	P. Beaver	Dept. of Tropical Med. and Public Health School of Medicine Tulane University	June, 1959
Martin Boyd Marx D.V.M.	M.P.H.	.....	.....	Harvard School of Public Health	June, 1959
Erby Massie D.V.M.	M.P.H.	.....	.....	School of Public Health Univ. of Mich.	June, 1959
Ralph Masterson D.V.M.	M.P.H.	Public Health Aspects of Rabies	.....	School of Public Health Univ. of N. Car.	June, 1959
Martin McBride B.S. D.V.M.	M.P.H.	Domestic Animals and Human Nutrition in the Tropics	Rodney Jung	Dept. of Tropical Med. & Public Health School of Medicine Tulane University	June, 1959

†M.P.H.—Master of Public Health; ‡D.V.P.H.—Diploma in Veterinary Public Health.

AWARDED PUBLIC HEALTH DEGREE—*Continued*

Name of student	Degree Received	Title of thesis	Major professor	Dept. and School	Date granted
Richard Morgan D.V.M.	M.P.H.	.....	.....	School of Public Health Univ. of Mich.	June, 1959
Lawrence Pessarra D.V.M.	M.P.H.	.....	.....	School of Public Health Univ. of Mich.	June, 1959
Kenneth D. Quist D.V.M.	M.P.H.	.....	William Reeves	School of Public Health Univ. of Calif.	June, 1959
Walter W. Sadler B.S. D.V.M.	M.P.H.	.....	William Reeves	Dept. of Epidemiology School Public Health Univ. of Calif.	June, 1958
James Shuler D.V.M.	M.P.H.	.....	.....	School of Public Health Univ. of Mich.	June, 1959
Joie W. Skaggs D.V.M.	M.P.H.	.....	William Reeves	School of Public Health Univ. of Calif.	June, 1959
Donald Daniel Stamm V.M.D.	M.P.H.	.....	D. E. Davis	School of Hyg. and Pub. Health The Johns Hopkins University	June, 1959
Norman Tufts A.B. D.V.M.	M.P.H.	.....	Ira Hiscock	School of Public Health Yale University	June, 1959
Javad Vakilzadeh B.S. D.V.M.	M.P.H.	Leptospirosis As a Public Health Problem	.....	School of Public Health Univ. of N. Car.	June, 1959
Otoniel Velasco D.V.M.	M.P.H.	.....	.....	Harvard School of Public Health	June, 1959
George T. Woods D.V.M.	M.P.H.	.....	William Reeves	School of Public Health Univ. of Calif.	June, 1959

The areas filled by a dash (—) indicate that there was no thesis required for the attainment of a degree or the name of the major professor was not given.

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Smith Kline & French to Acquire Norden Labs

Smith Kline & French Laboratories, of Philadelphia, Pa., have entered into an agreement which would provide for the purchase of Norden Laboratories, of Lincoln, Neb., manufacturer and distributor of veterinary pharmaceuticals and biologicals, on the basis of 3.5 shares of S.K.&F. stock for one share of Norden stock.

Under this plan, the Philadelphia pharmaceutical firm would acquire the assets and assume the liabilities of the Nebraska company. The acquisition is subject to approval by Norden stockholders.

When the transaction is completed, it will give S.K.&F. an established position in the veterinary field and provide a new market for some of its products. Norden Laboratories, which would continue as an S.K.&F. subsidiary, would then receive promising compounds from S.K.&F.'s research operations for development and subsequent marketing in the animal health area.

U.S. Livestock Sanitary Association to Meet Dec. 15-18 in California

About 400 members of the U. S. Livestock Sanitary Association are expected to be in San Francisco December 15 to 18, for the 63rd annual convention at the Sheraton-Palace Hotel. This is the group's first convention on the West Coast.

The Association membership consists of veterinarians, educators, research workers, livestock and poultry owners, and others interested in various segments of the livestock industry. It coordinates and sets up standards for the broad field of regulatory veterinary medicine, including control of anthrax, bovine tuberculosis, brucellosis, scabies, and other animal diseases.

The first day of the meeting will be devoted to committee discussions of biologicals and pharmaceuticals, infectious diseases of cattle, anaplasmosis, brucellosis, hog cholera, laws and regulations, leptospirosis, parasitic diseases, transmissible diseases of poultry, public health, rabies, stockyards, markets and transportation, transmissible diseases of swine, tuberculosis, vesicular diseases, and infectious diseases of sheep and goats.

General sessions on December 16-18 will be devoted to the presentation of scientific papers, and reports as arranged by the various committees. Some of the best informed animal scientists, veteri-

narians, regulatory officers, and livestock people in the country are scheduled to appear on the program. They will attempt to present the most recent information on their subjects available to them at this time.

Other groups to meet in San Francisco during or preceding the three days of the general sessions are: the Western States Livestock Sanitary Association; the National Assembly of Chief Livestock Sanitary Officials; the National Association of Federal Veterinarians; the agricultural research personnel of the U. S. D. A.; the federal and state personnel engaged in livestock regulatory work in California; and the National Association of Veterinary Laboratory Diagnosticians.

Other functions of the Association are: the study of livestock sanitary science; milk and meat hygiene and the dissemination of information relating thereto; the unification of laws, regulations, policies, and methods pertaining to milk and meat hygiene whenever possible; and livestock disease control programs.

Second National Conference on Tuberculosis Eradication

"Bovine tuberculosis can be eradicated" was the central theme of the Second National Conference on Tuberculosis Eradication sponsored by the Animal Disease Eradication Division of the U. S. D. A. in cooperation with the Kansas State University School of Veterinary Medicine, Aug. 17-21, 1959.

The conference was attended by state and federal regulatory officials from 49 states as well as representatives from Canada and England. Also included were representatives from veterinary colleges, public health departments, and the field of human medicine. Speakers on the program included leading national authorities in research, education, and regulatory services.

The comprehensive discussions covered nine major aspects involved in complete eradication of bovine tuberculosis. These were:

A positive mental approach toward total eradication.
Get maximum results from tuberculin tests.
A better knowledge of technical aspects.
Eliminate human exposure to cattle.
Broaden outlook through epidemiology to effectively disclose sources of infection.
Remove causes of associated sensitivity.
Profit from world-wide knowledge.
Replace opinions with facts.
Comprehensive diagnosis.

Such current problems as the effect of avian tuberculosis, human tuberculosis, and paratuberculosis on the diagnostic procedures used in detecting and eradicating bovine tuberculosis were extensively reviewed by the group. Investigations now in progress by the U. S. D. A., in cooperation with a number of states, should provide additional information on the significance of these factors to the over-all tuberculosis eradication effort.

Research and regulatory speakers on the program agreed that, on the basis of present knowledge and experience, tuberculosis can be eradicated by making maximum and uniform use of the tuberculin test in conjunction with complete epidemiological studies.

The conference was concluded with a panel of state regulatory officials summarizing each of the conference themes.

AMONG THE STATES AND PROVINCES

Alabama

Jefferson County Association.—At a recent meeting of the Jefferson County Veterinary Medical Association, the following new officers, all of Birmingham, were elected: Drs. H. T. Weir, president; Warren W. Kent, vice-president; R. P. Lusco, treasurer; and Daniel R. Farnell, secretary.

s/DANIEL R. FARNELL, *Secretary.*

California

San Francisco Veterinarians.—On June 18, 1959, the San Francisco Veterinarians elected the following officers: Drs. Lido Martinelli, president; B. M. McWhinney, vice-president; and Joseph Wachs, secretary.

s/KEN HUMPHREYS, *Executive Secretary to the Calif. V.M.A.*

Colorado

Northern Colorado Association Elects New Officers.—The Northern Colorado V.M.A. elected the following officers, Sept. 9, 1959: Drs. Glen Severin, president; K. W. Smith, president-elect; and E. J. Carroll, secretary-treasurer. All three officers are associated with Colorado State University in Fort Collins.

s/E. J. CARROLL, *Secretary.*

District of Columbia

Dr. Barron Leaves Air Force and Joins Commercial Firm.—Dr. Charles N. Barron (TEX '43) resigned from the U. S. Air Force, effective Aug. 7, 1959, and accepted a position with the pathology/toxicology section of Smith, Kline, & French Laboratories in Philadelphia, Pa., effective August 3.

He is assistant head of the pathology/toxicology section. Dr. Leon Z. Saunders (ONT '43) is section head.

Florida

Suwannee Valley Association Now Has Women's Auxiliary.—The wives of the mem-

bers of the Suwannee Valley Association met in Gainesville on Aug. 20, 1959, and succeeded in organizing a Women's Auxiliary.

Newly elected officers are: Mrs. Helen Holland, president; Mrs. Betsy Burch, vice-president; and Mrs. Jean Pritchard, secretary-treasurer.

This is the second regional auxiliary to be formed in Florida. The first was the Women's Auxiliary to the Hillsboro County V.M.A. (*see* the JOURNAL, July 15, 1959, p. 137).

s/M. W. EMMEL, *Executive Secretary, Florida State V.M.A.*

Maryland

Short Course Held in September.—The District of Columbia Academy of Veterinary Medicine held a short course entitled "Laboratory Procedure with Emphasis on Interpretation," Sept. 21-24, 1959, at the National Institutes of Health, Bethesda, Md.

Dr. John Bentinch-Smith (COR '44), professor of veterinary pathology at Cornell University, conducted the course.

The Academy's regular meeting on September 24 featured Dr. Timothy Brasmer (COL '47), Danville, Ill., who discussed "Canine Geriatrics".—*District of Columbia V.M.A. Newsletter (Oct. 1, 1959)*: 1.

Montana

Women's Auxiliary to State Association.—The ninth annual meeting of the Women's Auxiliary to the Montana V.M.A. was held in the Roundup Room, of the Finlen Hotel, in Butte, June 8, 1959.

Mrs. Don Shaffner, Dillon, president, presided at the business meeting. Reports were made on the Auxiliary's loan funds set up for Montana veterinary students at Colorado State University and Washington State University.

Officers elected for the coming year are: Mrs. R. J. Miser, Conrad, president; Mrs. Jay Newhall, Bozeman, president-elect; Mrs. Dell Gates, Lewistown, first vice-president; Mrs. Earl Cooper, Missoula, second vice-president; Mrs. Harold Nordell, Great Falls, third vice-president; Mrs. Earl Cline, Lewistown, secretary; and Mrs. R. W. Gustafson, Conrad; treasurer.

A sheep shearing exhibit and barbecue was held for the veterinarians and their wives following the afternoon meetings. On June 9, a luncheon was also given at the Finlen Hotel followed by a tour of Butte copper mines.

s/LAGRACIA COOPER, *Second Vice-President.*

New York

State Association.—The 68th annual meeting of the New York State Veterinary Medical Society was held at Grossinger's, in Grossinger, N.Y., Sept. 16-18, 1959. Attendance included 531 veterinarians and guests.

Dr. Peter Olafson, president, presided at the opening session. Among those appearing at this session were the Hon. Don J. Wickham, commissioner of the State Department of Agriculture and Markets, and Dr. Paul A. Bunn, professor of medicine, State University of New York, Upstate Medical Center, Syracuse.

Mr. Wickham outlined "The Job Ahead" for his department in controlling livestock diseases and the importance of veterinarians in successful administration of these programs. Dr. Bunn presented an extensive treatise on the therapeutic use of antibiotics. Mrs. Jane Dorney, president of the Women's Auxiliary, also addressed this session.

Dr. Frank E. McClelland, Sr. (left), receives the "Veterinarian of the Year" Award from Dr. J. M. Delaney, Mount Holly, N.J. Dr. Delaney was chairman of the committee which selected this year's recipient.

In the afternoon of September 16, a panel on distemper-hepatitis vaccination was moderated by Dr. J. A. Baker, director of the veterinary diagnostic laboratory at Cornell University. Dr. T. F. Benson, J. H. Gillespie, and Jack Mindell assisted as panel members.

The small animal session on September 17, featured five-minute presentations by several small animal specialists demonstrating improved clinical procedures, followed by a clinico-pathological conference headed by Dr. R. W. Kirk and John Bentinck-Smith and a panel of small animal practitioners.

Dr. J. M. Cerosaletti, director of the Division of Animal Industry, outlined the problems in the disease control programs of the State Department of Agriculture and Markets, at the large animal session held also on September 17. Practical aspects for improvement of the large animal practitioner's situation highlighted this session. Dr. C. E. Hall, program chairman, also led a discussion on present-day problems encountered in the large animal field.

He was assisted by Drs. B. W. Widger, Marcellus, N. Y.; V. L. Tharp, Ohio State Uni-

versity; and W. J. Gibbons, Alabama Polytechnic Institute.

Officers of the Society for 1960 are: Drs. Hadley C. Stephenson, Ithaca, president; Charles E. Fletcher, New York City, president-elect; and William J. Sellman, Utica, treasurer.

N.Y.'s Veterinarian of the Year

A committee composed of three out-of-state veterinarians chose Dr. Frank E. McClelland, Sr., of Buffalo, the N.Y. State V.M.S.'s "Veterinarian of the Year." Presentation of the Award was made at the Society's 68th annual meeting in Grossinger.

Dr. McClelland (COR '09) has devoted 50 years of service to the profession and to the community. He was a charter member and past president of the Western New York V.M.A.; a charter member of the Buffalo Academy of Veterinary Medicine and past president of the N.Y. State V.M.S. He also served on the executive board of the Society from 1951 to 1956.

Since 1954, Dr. McClelland has served on the Cornell University Advisory Council for the N.Y. State Veterinary College. In addition, he has an avid interest in young people, and has devoted 39 years to Y.M.C.A. work. He has been a member of the AVMA for 44 years.

s/SAM STEIGER, *Executive Secretary.*

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Women's Auxiliary to the State Association.—The eleventh annual meeting of the Women's Auxiliary to the New York State Veterinary Medical Society was held on Sept. 17, 1959, at the Grossinger Hotel, in Grossinger, N. Y. Mrs. George Dorney, president, presided. Attendance totaled 157.

Reports were received from the local auxiliaries in the state. Plans for a new auxiliary on Long Island were announced, thereby making 100 per cent coverage within the state possible.

A special committee on education outlined a campaign to acquaint high school students with the opportunities in the field of veterinary medicine. Members of each region were asked to visit their schools and to distribute the AVMA brochure, "Veterinary Medicine as a Career," to interested students.

Mrs. M. Fincher of Ithaca gave an excellent report on the A.V.M.A. Auxiliary meeting at Kansas City this summer and a representative of the Junior Chapter of the AVMA Auxiliary at Cornell discussed its activities during the past year.

The State Auxiliary, together with donations from several regional groups, have placed photo-murals of the three original buildings of the veterinary college at Cornell in the reading room of the new veterinary school.

During the coming year, the Auxiliary will continue to contribute to all the various activities it has donated to in the past year and will also include the AVMA Student Loan Fund.

The officers elected to assume office on Jan. 1, 1960, are: Mrs. C. E. Fletcher, New York City, president; Mrs. Thomas Love, Watkins Glen, president-elect; Mrs. DuBois Jenkins, Catskill, secretary; Mrs. John C. Sweatman, Roxbury, treasurer; and Mrs. Donald C. McKown, Franklin, membership chairman.

s/MRS. C. E. DECAMP, *Publicity Chairman.*

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New York City Association.—A regular meeting of the Veterinary Medical Association of New York City, Inc., was held at the New York Academy of Sciences, in New York City, on Nov. 4, 1959.

Dr. W. H. Rhodes, radiologist at the University of Pennsylvania, discussed "Radiography of the Canine Thorax."

North Carolina

New Roster for the Western N. Car. Association.—Officers of the Western North Carolina V.M.A. for 1959-1960 are: Drs. M. S. Setser, Waynesville, president; R. W. La Du, West Asheville, vice-president; and H. A. Justus, Hendersonville, secretary-treasurer.

The Association no longer meets the second Thursday of each month; it now convenes monthly on the *third* Thursday, in Asheville.

s/VIIU LIND, *Secretary.*

Ohio

New Regional Auxiliary to the North Central Association.—The Women's Auxiliary to the North Central Ohio V.M.A. was organized early in 1958 and by the end of the year—membership numbered 30.

The Auxiliary's primary activity is in the public relations field, both as a group and by individual effort. The members have distributed the pamphlet, "Veterinary Medicine as a Career," in junior high schools, high schools, and public libraries, within the North Central area.

In addition, it has made contributions to the AVMA Research Fund, the Student Loan Fund, and to the Clipping Service.

Auxiliary officers are: Mrs. J. E. Fox, La Rue, president; Mrs. W. R. Henson, Shelby, vice-president; Mrs. M. E. Epperson, Galion, secretary; and Mrs. Paul E. Eippert, Upper Sandusky, treasurer.

s/MRS. M. E. EPPERSON, *Secretary.*

Pennsylvania

Dr. Gibbs Joins Pennsylvania State University.—Dr. Robert E. Gibbs (UP '44) formerly with Whitmoyer Laboratories at Myerstown, has been named to the extension veterinary science staff of Pennsylvania State University. Dr. Gibbs will fill a vacancy on the extension

staff and will have the rank of associate professor.

Born in Lancaster, he attended the schools there, did his preveterinary training at Franklin and Marshall College, and in 1944, received his V.M.D. degree from the University of Pennsylvania. For the next eight years he was with the University of Maryland, and since 1952, with the Myerstown firm.

STATE BOARD EXAMINATIONS

TEXAS—Jan. 11-13, 1960, Austin. The completed application must be received in the Board office not later than 30 days before the examination date. Requests for information and applications should be sent to: Mr. T. D. Weaver, Executive Secretary, Texas State Board of Veterinary Medical Examiners, 207 Capital National Bank Building, Austin 16, Texas.

FOREIGN NEWS

Copenhagen, Denmark

First International Congress of Endocrinology.—The First International Congress of Endocrinology will be held at the Technical University of Denmark, in Copenhagen, July 18-23, 1960. The Congress will be opened to all interested persons.

The scientific program consists of ten symposiums, a round table discussion, and short communications on the subjects of the symposiums.

There will be four speakers and four others who will discuss the speeches at four three-hour symposiums and there will be three speakers and three others who are invited to discuss the material presented at six two-hour symposiums.

The symposiums will consist of the following subjects:

The central nervous system; regulation of anterior pituitary secretion
Posterior pituitary hormones
Parathyroid hormone and calcium metabolism
Anterior pituitary hormones
Adrenocortical syndromes
Aldosterone
Aspects of reproduction
Seroid pharmacology
Hormone action at the cellular level
Topics in comparative endocrinology.

The round table discussions will include "The Validity of Hormone Assays applicable to Clinical Medicine." Each subject will be covered by one principal speaker and three subsidiary speakers.

Simultaneously with the symposiums, a number of sessions will be held for the presentation of short communications (of a ten-minute duration) related to the subjects of the conference.

Official languages of the Congress will be English, French, German, and Spanish. A volume containing advance abstracts of lectures and communications will be distributed to the members on registration.

Anyone interested in participation in the Congress who has not previously submitted his name to the Congress is requested to do so at his earliest convenience. *All abstracts must be in the hands of the committee before Dec. 31, 1959.*

The Congress has sent registration forms and forms for the submission of abstracts of short communications to all those who had previously contacted the secretariat.

The American Express Company is the official travel agent of the Congress. Together with the above mentioned forms for registration, it will also enclose forms for hotel accommodations.

S/CHRISTIAN HAMBURGER AND SVEND G. JOHNSEN, *Correspondents.*

DEATHS

Star indicates member of AVMA

Paul J. Landis (OSU '33), 78, Winchester, Va., died Sept. 6, 1959, after a long illness.

His one son, Dr. James S. Landis (OSU '33) of Norfolk, Va., is also a veterinarian.

★J. R. Severin (KCV '10), 74, San Marino, Calif., a retired member of the board of directors of Allied Laboratories, Inc., died Sept. 2, 1959, of cancer. He had been ill for several months.

Dr. Severin was one of the owners of the Wichita-Oklahoma Serum Company in Wichita, Kan., which later became the United Serum Company. In 1929, when the firm joined other serum producing companies to form Allied Laboratories, Inc., he became a member of the board of directors and continued in that capacity until his retirement, Jan. 1, 1959. Altogether, he had been with the company for about 30 years.

Following his retirement, Dr. Severin moved to San Marino, where he resided until his death. Funeral services were held at Glendale, Calif., on September 4.

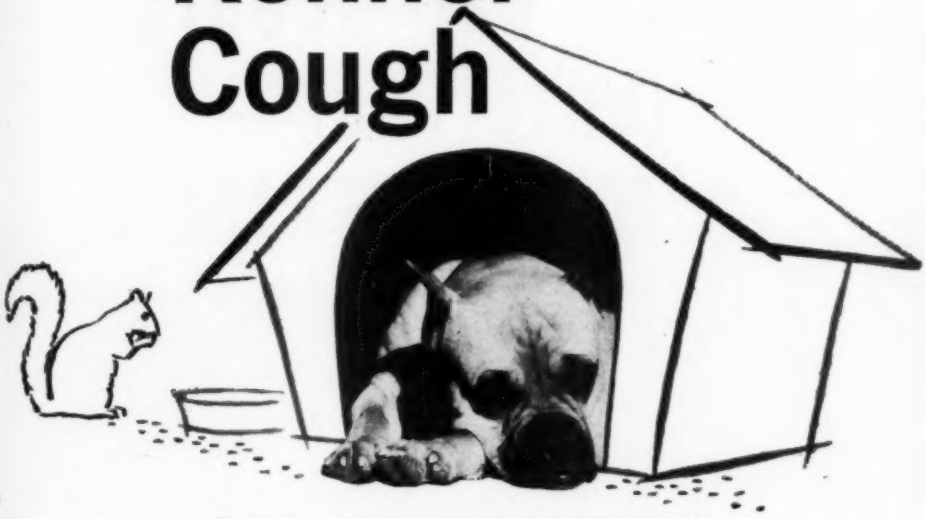
George T. Smith (KCV '14), 68, Reinbeck, Iowa, died Oct. 14, 1959, of a heart ailment. He had been in ill health a long time.

After graduation in 1914, Dr. Smith practiced for a year at Graettinger, Iowa, before locating at Reinbeck where he practiced until his retirement in 1956.

Joseph C. Wingert (CVC '05), 83, Marengo, Ill., died July 26, 1959, at his son's home in Bettendorf, Iowa.

He was a life member of the Illinois State V.M.A. and, in 1957, he was awarded the Association's fifty-year pin. Dr. Wingert had been in animal disease control work most of his professional life and was employed by the Division of Livestock Industry from 1942 until his retirement in 1958.—*The Illinois Veterinary Bulletin, 14, (August-September, 1959):6.*

Kennel Cough



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1. Osborne, J. C. *in* New Horizons in Chemotherapy. Proceedings of First Regional Conference on the Nitrofurans in Veterinary Medicine. In press.
2. Bull, W. S.: N. Amer. Vet. 38: 3 (Jan.) 1957.

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What Is Your Diagnosis?

Because of the interest in veterinary radiology, a case history and radiographs depicting a diagnostic problem are usually published in each issue.

Make your diagnosis from the picture below—then turn the page ▶

Fig. 1 (above)—Lateral radiograph of a dog taken after barium solution had been given.

Fig. 2 (right)—Ventrodorsal radiograph of the same dog, taken at approximately the same time.

History.—A female Poodle, 4 years old, was acutely ill, showing signs of shock characterized by weakness, cough, dyspnea, and paleness of the mucous membranes. Rattling sounds, particularly on the right side of the thorax, were heard during both inspiration and expiration. The illness dated back two weeks when the dog choked and then coughed up an undigested piece of cured bacon rind. The owner related that two such pieces of rind had been ingested apparently without harm 30 days before the choking had occurred. The dog had acted and eaten normally up to the time of the choking. Barium solution was administered *per os* and lateral and dorsoventral radiographs of the thorax were taken (fig. 1 and 2).

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Barium solution was visible in the bronchial tree of the right diaphragmatic lobe of the lung, the result of an esophagobronchial fistula. (The dog died shortly after the radiographs were taken.)

Comment.—It is assumed that when the bacon rind was regurgitated it lodged in the esophagus just posterior to the heart and that the sharp edges penetrated the esophagus and bronchus. Penetration of the wall of the esophagus by foreign bodies is not unusual but it would seem unusual for a piece of cured bacon rind to remain undigested in a dog's stomach for 30 days. The owner insisted that this was the only time the dog had access to bacon rind. It was not determined whether the other piece of rind was still in the stomach.

This report was submitted by Dr. H. G. Niemand, Berlin, Germany.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

Instructions to Authors

JOURNAL *of the AVMA*

Exclusive Publication.—Articles submitted for publication are accepted with the understanding that they are not submitted to other journals, which is ethical publication procedure.

Manuscripts.—Manuscripts, including **footnotes, references,** and **tables,** must be typewritten, **double-spaced,** on 8½- by 11-in. bond paper, and the original and one carbon copy, submitted. One-inch margins should be allowed on the sides, with 2 in. at top and bottom. Articles should be concise. Short, simple sentences are clearer and more forceful than long, complex ones.

Illustrations.—Photographs should be furnished in glossy prints, and of a size that will fit into the JOURNAL of the American Veterinary Medical Association with a minimum of reduction. Photomicrographs which can not be reduced should be marked for cropping to 1-column or 2-column width. Identifying marks within the photomicrographs, such as arrows, letters, or numbers, should be clearly marked with black India ink or white opaque ink to insure good contrast for reproduction and must be large enough to stand reduction, if necessary.

Drawings, graphs, and charts should be made clearly and accurately in India ink on white paper and a glossy print of them submitted when possible. Numbers or letters appearing on graphs or charts should be large enough to allow for any reduction necessary for the chart or graph to fit JOURNAL pages. Blue lines in graph paper drop out in reproduction; therefore, if lines are required they must be drawn in black ink. All illustrations should bear the name of the author and the illustration number on the back.

Tables.—Tables should be simple and typed **double space.** Complex tables are not conducive to perusal. It is wiser to summarize complex material than to tabulate it.

References.—References should be typed **double space,** in alphabetical order, and should be prepared in the following style: name of author, title of article, name of periodical with volume, year, and page numbers. References to journals not commonly known should give the complete name of the periodical, and where published so that they may be added to our reference files. When books are cited, the name of publisher, location, edition, and year should be given.

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1. Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

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More Reports of the Group Conferences Held During the Kansas City Meeting

The bulk of reports of allied organizations, which met in Kansas City and environs last August during the AVMA Convention, were carried in the Organization Section of the Nov. 1, 1959, issue.

Following are the reports we received too late to publish with them.

American Animal Hospital Association

Seventy-six members gathered at the Hotel Muehlebach in Kansas City, Aug. 26, 1959, for the semi-annual business luncheon of the American Animal Hospital Association. President William K. Riddell presided and discussed the activities of the year and the plans for the forthcoming annual meeting at Boston, Mass. in April, 1960.

The format for this meeting will be similar to that of other years except that it will convene one day earlier in the week. The meeting will start on Tuesday, April 19th, with four seminars, followed by the annual business luncheon. The opening session will be on Wednesday morning, April 20th. The convention will adjourn on Friday, April 22nd, following the question and answer luncheon. This schedule will permit those who wish, to be home on Saturday.

Many AAHA members participated in the small animal program of the AVMA convention. Drs. C. Edwin Hofmann of Tulsa, Okla., and the late William F. Irwin (*see* the JOURNAL, Oct. 15, 1959, p. 447) served as co-chairman and Dr. Jacob E. Mosier, Manhattan, Kan., acted as secretary of the section on small animal medicine.—*Wayne H. Riser, President-Elect.*

Association of American Boards of Examiners in Veterinary Medicine

The Association of American Boards of Examiners in Veterinary Medicine met on August 23 and 24, 1959, at the Muehlebach Hotel in Kansas City. Twenty-four board representatives were present. There are 22 paid-up states with three more participating until funds are available for paid membership.

The Association continued its evaluation of the National Boards and discussed the problem of conflicting dates and candidates repeating the same examinations in different states. The resolutions submitted by the Council on Education were considered and adopted. A survey of all the Boards will be made soon to help the Association obtain needed information.

Officers elected at the meeting are: Drs. E. R. Walker, Pawhuska, Okla., president; W. J. Zontine, Lancaster, Calif., first vice-president; Charles Rife, Atlanta, Ga., second vice-president; and R. R. Shomer, Teaneck, N.J., secretary-treasurer.—*R. R. Shomer, Secretary-Treasurer.*

American Association of Veterinary Parasitologists

The American Association of Veterinary Parasitologists held their all-day annual meeting in the Hotel Muehlebach, Kansas City, Mo., on Sunday, Aug. 23, 1959. Registration totaled 60.

The morning session was devoted to papers on phenothiazine and Dictycide, followed by a discussion period.

The afternoon session consisted of a symposium on research with papers on swine kidney worm, ovine coccidiosis, larva migrans, lungworm disease, and new insecticides. A question and answer period followed.

Dr. Wendell Krull of Oklahoma State University also gave an excellent paper on "Need for Training Veterinary Parasitologists." At a short business meeting, Dr. E. G. Batte, North Carolina State College, was elected secretary-treasurer for a period of two years.

The evening program consisted of slides and explanations on "Observations of Veterinary Medicine and the Soviet Union."

Dr. Norman Baker of California was named chairman of the program committee for the Association's next meeting in Denver, Colo., which will be held during the A.V.M.A.'s Convention in August, 1960. Veterinary Parasitologists and others interested in participating in this meeting should contact Dr. Baker.—*F. R. Koutz, President.*

American Veterinary Exhibitors Association

One hundred and five members and guests attended the American Veterinary Exhibitors Association meeting on Aug. 23, 1959, at the Hotel Muehlebach in Kansas City, Mo. The meeting was called to order by President L. A. Mosher.

Dr. Dan Anderson, chairman of the AVMA Executive Board, presented a short talk on the future of a strong Veterinary Medical Association and the importance of free enterprise.

Mr. Russell Rongren, AVMA business manager, discussed the action of the AVMA in requesting exhibitors to open their displays on Sunday and to remain closed on Monday morning. He also advised the group of the potential convention schedule for the AVMA.

President-Elect of the AVMA, Dr. Samuel Scheidy, also addressed the Association. He expressed his appreciation of the mutual interests of exhibitors and professional men and emphasized the importance of new product information which is disseminated at exhibits at the various professional meetings.

Dr. John G. Hardenbergh, general consultant to the AVMA, reminisced about his early years as Executive Secretary to the AVMA, when the A.V.E.A. officers visited his office in Chicago to help work out problems for the best interests of the AVMA and the exhibitors.

Newly elected A.V.E.A. officers for 1960 are: Mr. John O. Gwin, Armour Pharmaceutical Company, Chicago, Ill., president; Mr. Donald A. Hoff,

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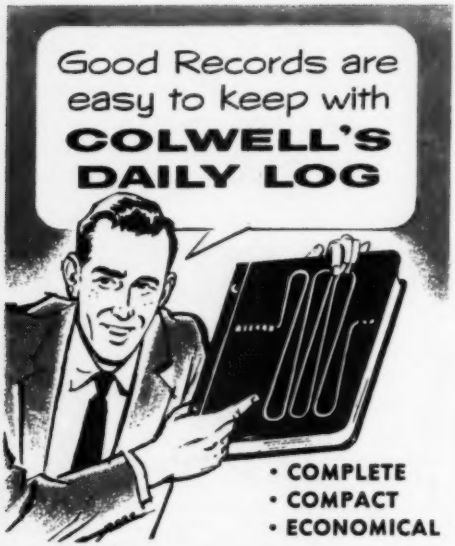

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Warren-Teed Products Company, Columbus, Ohio, vice-president; and W. L. Martin, Eaton Laboratories, Norwich, N.Y., secretary-treasurer.

Mr. Charles Ranner, Jr., of Schering Corporation, was elected to fill a three-year term on the Association's executive committee. In addition, all the executive committee members expressed their appreciation to Dr. Carl Norden, Jr., advisory trustee, who retired from service on the committee. His place is taken by Dr. L. A. Mosher.—*W. L. Martin, Secretary.*

American Association of Veterinary Anatomists

The eleventh annual meeting of the American Association of Veterinary Anatomists was held in Kansas City, Mo., Aug. 23-25, 1959. A total of 35 members and five visitors were present at one or more of the three sessions.

The program included: Dr. L. E. St. Clair, Urbana, Ill.—the current progress in the revision of anatomical nomenclature; and Dr. Robert Getty, Ames, Iowa—a review of the history of the International Association of Veterinary Anatomists.

Doctors St. Clair and Getty were delegates to the International Association of Veterinary Anatomists' meeting and also represented the A.A.V.A. at the Veterinary Anatomical Nomenclature Conference held in Madrid, Spain, March 21-27. Their trip was made possible by funds provided by the National Science Foundation.

Other reports included the affiliation of the A.A.V.A. with the Armed Forces Institute in obtaining histological collections, research projects in progress, and new textbooks and guides.

The following officers were elected for the coming year: Drs. Clifford Westerfield, Athens, Ga., president; T. C. Fitzgerald, Auburn, Ala., president-elect; and Robert Getty, secretary-treasurer.—*T. C. Fitzgerald, President-Elect.*

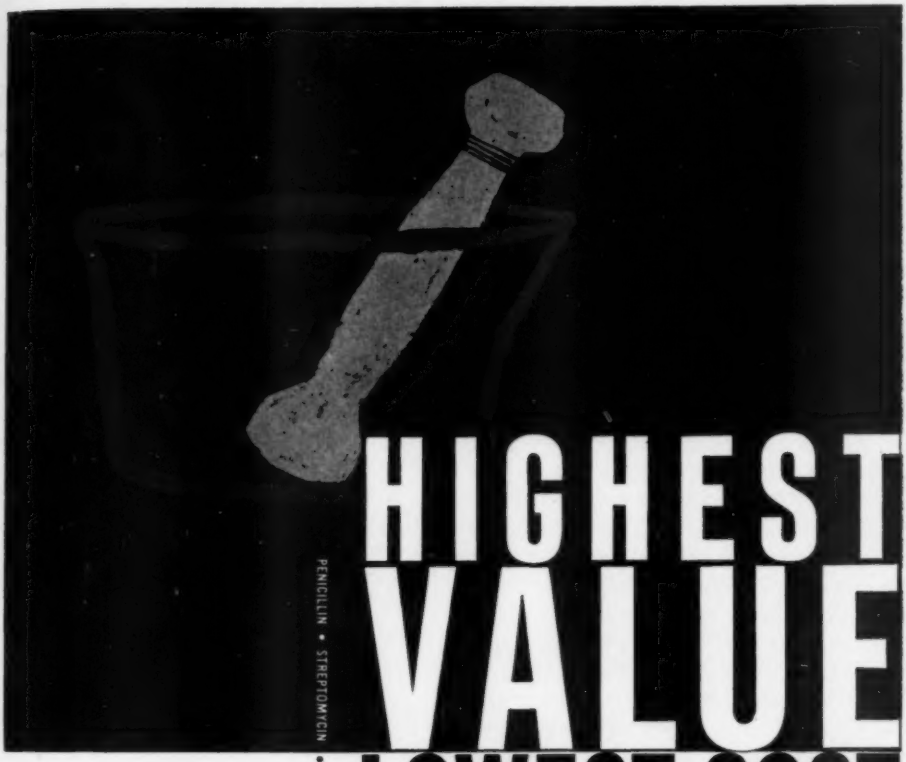
APPLICATIONS

Applicants Not Members of Constituent Associations

In accordance with paragraph (c) of Section 1, Article I, of the Bylaws, the names of applicants who are not members of constituent associations shall be published in the JOURNAL. Written comments received by the Executive Secretary from any active member regarding the application as published, will be furnished to the Judicial Council for its consideration prior to acceptance of the application.

MERCHANT, WILLARD R.
P.O. Box 2137, Fort Worth, Texas.
D.V.M., Iowa State University, 1932.
Vouchers: W. E. Jennings and G. H. Zacherle, Jr.

STEVENS, ALAN D.
Second U.S. Army Veterinary Unit, Nichols Dr. and Manslick Rd., Louisville, Ky.
D.V.M., Cornell University, 1947.
Vouchers: W. E. Jennings and G. H. Zacherle, Jr.



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Public Relations

Exhibits

■ Several constituent and local veterinary medical associations have, from time to time, developed exhibits for showing at non-professional shows and fairs. Many of the veterinary students have also developed exhibits for showing at open houses held in their respective schools.

Those veterinary groups which developed exhibits, have found that $800 to $1,000 is a minimum when employing exhibit craftsman. Using talent among the membership, several local associations have developed attractive displays for as little as $125.

From requests reaching AVMA headquarters, there are at least three opportunities for displaying an exhibit each year. Community public health fairs in early spring, high school career days between February and June, and agricultural fairs during the summer months. There are many other opportunities which vary from community to community.

Last year, in an attempt to make it possible to serve the majority of requests which are concentrated between March and August, the AVMA offered a plastic exhibit frame and five inserts for $200. To establish the unit price, between 50 and 100 orders were required, and 14 were received.

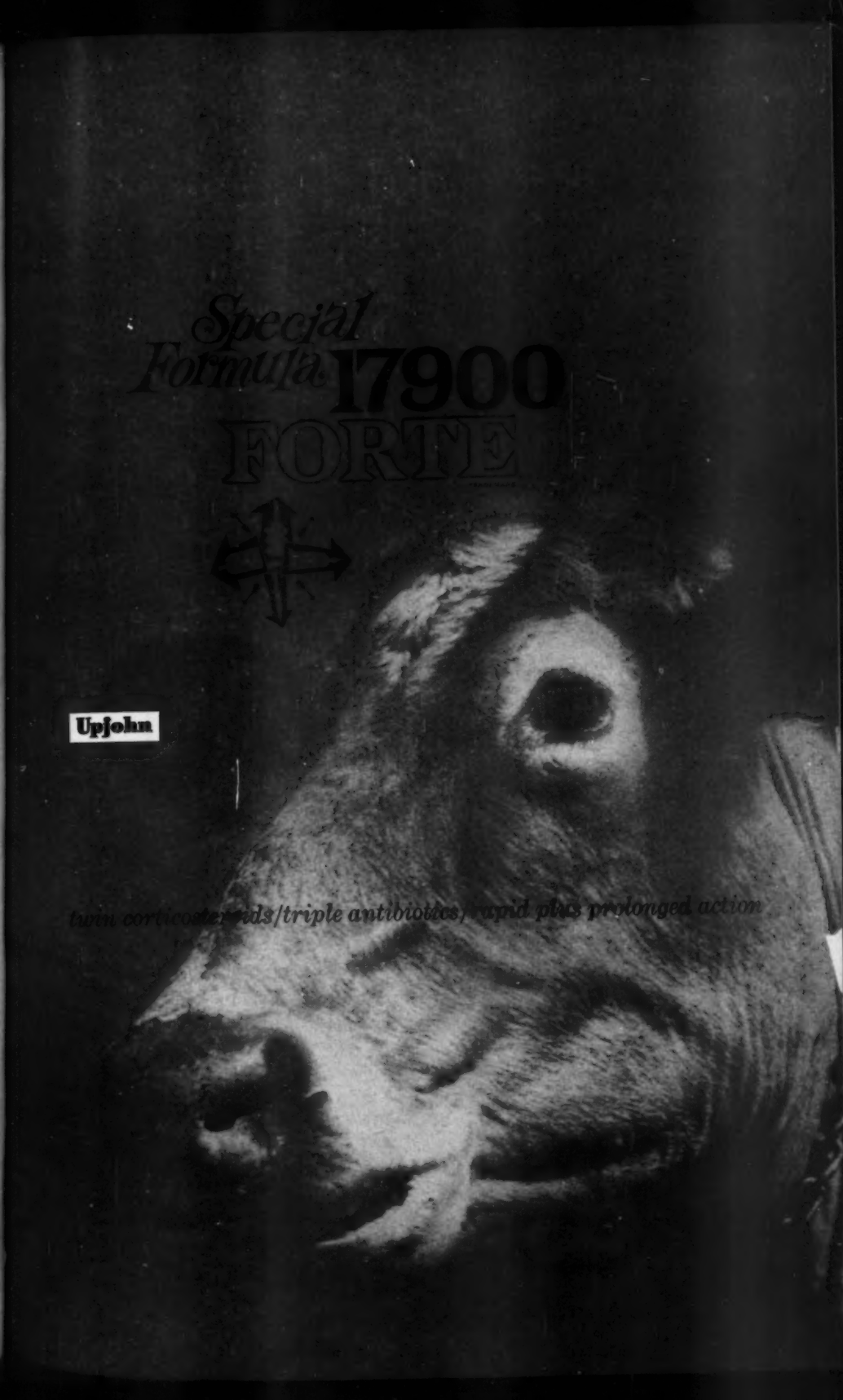
In an attempt to serve the requests at a price constituent associations could afford, a new exhibit was developed. To keep the initial cost down, only sections which can be mass produced and easily shipped are included, other parts to be provided by the purchasing associations.

The basic exhibit consisting of a steel frame, covered with peg board and furnished with one silk screen display, was introduced to the state secretaries conference on Saturday, November 21.

An experimental model will be kept at AVMA headquarters in Chicago for developing additional displays from the basic frame. These displays will be incorporated in a book of plans which will be furnished to the associations owning a unit.

If enough states participate, the AVMA plans to develop additional displays for the frame to add another dimension to the speakers kits now available on mastitis, "Veterinary Medicine in Our Modern World," and rabies. Another kit is under development with the Council on Public Health and Regulatory Veterinary Medicine. The subject will be "The Veterinarian and Public Health." ■

Pilot Model
The exhibit introduced to the state secretaries November 21 is shown as it was being developed in the AVMA headquarters.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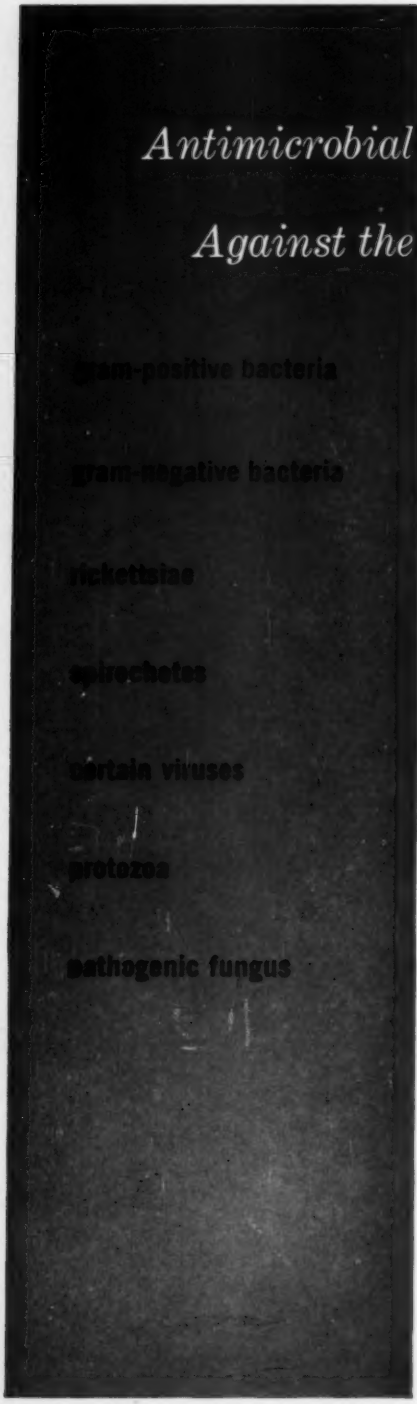

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History of the AVMA

1875

The meetings for 1875 were held in Boston and at the American Veterinary College—newly formed under Alexandre Liautard's leadership by secession from the New York College of Veterinary Surgeons. For a considerable period the American Veterinary College more or less served as an unofficial headquarters for the Association, with committee and other meetings being held in Dr. Liautard's office.

An appropriation was made for the monument to Claude Bourgelat, and it was ordered that two prizes be given each year for the two best papers on any veterinary subject.

For the first time in its history, the U.S.V.M.A. admitted a "large" group of new members—numbering 25 per cent of the active membership. The 11 men admitted included two future presidents of the Association: Charles P. Lyman and Charles Michener. For the first time, a majority of the elected officers (other than the Board of Censors) were filled by other than charter members of the Association: T. S. Very, vice-president; J. D. Hopkins, recording secretary; and C. P. Lyman, corresponding secretary. Dr. Liautard was elected president, and Charles Burden was re-elected treasurer for the seventh time—a position he was to hold for another nine years.

✦ ✦ ✦

ALEXANDRE F. LIAUTARD, V.M., M.D., eighth and 14th President of the U.S.V.M.A., was born in Paris in 1835, and graduated from Alfort in 1856. Without doubt, his coming to America was a signal event for the veterinary profession, for perhaps more than any other one individual, it was he who held the U.S.V.M.A. together during its early years. One of the founding fathers, he was the only one of this select group of 40 to hold an elective office for more than 20 years in succession. J. H. Stickney was his only contender with 17 years of consecutive service as an elected officer.

In 1877, he became editor of the *American Veterinary Review*. Always strong willed, he apparently preferred to run the *Review* without supervision. While he continued to be a staunch friend of the Association, he also became free to criticize it, which he did in no uncertain terms—and continuously—but in a constructive manner. Undoubtedly his biting satire was a major factor in stimulating the Association to perform at an ever-increasing tempo. After he severed his financial interest in the *Review* in 1900 and returned to France, he continued in effect as senior editor for another 15 years.

Alexandre F. Liautard. U.S.V.M.A. president, and editor of the "American Veterinary Review."

After purchase of the *Review* by the AVMA in 1915, he continued a monthly feature until his death in 1918—a stretch of 41 years during which he contributed regularly to American veterinary literature.

His record as an educator was no less outstanding, despite the fact that the *American Veterinary Review* is his permanent monument to posterity. Through his efforts, the faltering New York College of Veterinary Surgeons became a going institution, but when internal affairs became untenable, he withdrew with most of the students to form the American Veterinary College in 1875. This school remained a vital force in veterinary education for the 25 years he was its head, and a substantial number of the future leaders of the profession came from the ranks of its graduates.

Like other mortals, of course, Dr. Liautard was not without his faults. While his continuous advocacy of higher standards for veterinary education undoubtedly was a major factor in this becoming a reality, he continued to hold his own school to the old two-year course—possibly at the insistence of a major part of his faculty. Although he lived in the United States for 40 years and amassed a small fortune, he never became a citizen. For much of his life here he was referred to affectionately as "Frenchy" by his closest associates—although perhaps not to his face.

He was characterized as "very fatherly with his students, stern, and yet intimate, without allowing familiarity. Severe and friendly, strict to all and demanding of each the exact performance of his duties, he was very much liked and yet feared more or less by all." His death in 1918 was an occasion for mourning by members of the veterinary profession in all parts of the world.

ACETONEMIA

HYPOGLYCEMIA

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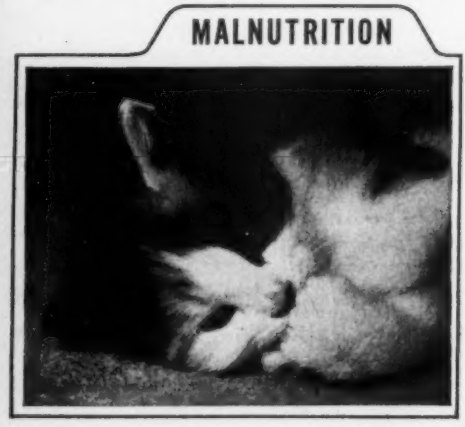

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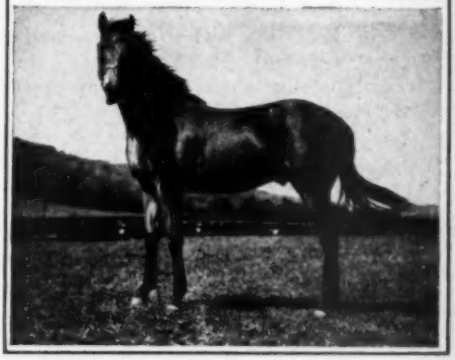
PNEUMONIA



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COMING MEETINGS

Notices of coming meetings must be received 30 days before date of publication.

Nebraska Veterinary Medical Association. Winter meeting. Cornhusker Hotel, Lincoln, Neb., Dec. 1-3, 1959. Dr. H. E. Hedlund, 403 N. Broadway, Wahoo, program chairman.

Eastern Illinois Veterinary Medical Association. Winter dinner meeting. Hotel Tilden Hall, Champaign, Dec. 3, 1959, at 6:30 p.m. Edwin I. Pilchard, Jr., secretary-treasurer.

Arizona State Veterinary Medical Association. Annual meeting Rancho Grande Hotel, Nogales, Ariz., Dec. 6-8, 1959. J. D. McCullough, 702 Yale Dr., Tucson, correspondent.

National Association of Federal Veterinarians. Forty-second annual meeting. Sheraton-Palace Hotel, San Francisco, Calif., Dec. 14, 1959, at 7:30 p.m. L. T. Hopkins, 5837 Highland Ave., Kansas City 4, Mo., secretary-treasurer.

American Association of Equine Practitioners. Fifth annual meeting. LaSalle Hotel, Chicago, Ill., Dec. 14-16, 1959. Dr. M. B. Teigland, 2560 State Service Rd., Opa Locka, Fla., secretary-treasurer.

United States Livestock Sanitary Association. Sixty-third annual meeting. Sheraton-Palace Hotel, San Francisco, Calif., Dec. 15-18, 1959. R. A. Hendershott, 33 Oak Lane, Trenton, N.J., secretary.

New York State Veterinary College. Fifty-second annual conference for veterinarians. New York State Veterinary College, Cornell University, Ithaca, Jan. 6-8, 1960. George C. Poppensiek, dean.

Kansas Veterinary Medical Association. Fifty-sixth annual convention. Hotel Broadview, Wichita, Jan. 10-12, 1960. Melvin W. Osburn, 1525 Humboldt, Manhattan, Kan., secretary.

Tennessee Veterinary Medical Association. Annual meeting. Noel Hotel, Nashville, Jan. 10-12, 1960. H. W. Hayes, 5009 Clinton Pike, Knoxville, Tenn., secretary.

Wisconsin Veterinary Medical Association. Winter meeting. Schroeder Hotel, Milwaukee, Jan. 10-12, 1960. W. J. O'Rourke, 1215 Vilas Ave., Madison 5, Wis., secretary.

Nevada State Veterinary Medical Association. Winter meeting. Riverside Hotel, Reno, Jan. 11-12, 1960. Brian L. Hutcherson, 2490 South Virginia St., Reno, Nev., secretary.

Indiana Veterinary Medical Association. Seventy-sixth annual convention. Hotel Severin, Indianapolis, Ind., Jan. 13-15, 1960. L. M. Borst, 3315 Shelby, Indianapolis, secretary.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Des Moines, Jan. 19-21, 1960. F. B. Young, Waukee, Iowa, secretary.

Michigan State University. Thirty-seventh annual postgraduate conference for veterinarians. College of Veterinary Medicine, Michigan State University, East Lansing, Jan. 20-21, 1960. W. W. Armistead, dean.

Intermountain Veterinary Medical Association. Annual meeting. Hotel Utah, Salt Lake City, Jan. 21-23, 1960. For information contact: Dr. Douglas H. McKelvie, 1220 South State St., Salt Lake City, Utah, or Dr. R. A. Bagley, 4600 Creek View Dr., Murray, Utah.

Mississippi State Veterinary Medical Association, Inc. Annual meeting. Hotel Heidleberg, Jackson, Miss., Jan. 23, 1960. Joseph W. Branson, P.O. Box 4223, Fondren Sta., Jackson, Miss., secretary-treasurer.

Minnesota State Veterinary Medical Society. Annual meeting. Hotel St. Paul, St. Paul, Minn., Jan. 25-27, 1960. B. S. Pomeroy, University of Minnesota, College of Veterinary Medicine, St. Paul 1, Minn., secretary.

Louisiana State University. Twenty-ninth annual short course for veterinarians. Pleasant Hall, Louisiana State University campus, Baton Rouge, Jan. 26-27, 1960. R. B. Lank, Department of Veterinary Science, Louisiana State University, chairman.

North Carolina Veterinary-Nutrition Conference. Twenty-second annual veterinary conference in joint-session with the North Carolina Feed Industry. College Union, North Carolina State College, Raleigh, Jan. 27-28, 1960. E. G. Batte, chairman.

Ontario Veterinary Association. Annual convention and trade exhibit. Royal York Hotel, Toronto, Jan. 28-30, 1960. W. E. Jolliffe, Suite 102, 97 Eglinton Ave., East, Toronto 12, Ont., registrar.

Ohio State Veterinary Medical Association. Annual meeting. Deshler-Hilton Hotel, Columbus, Jan. 31-Feb. 3, 1960. R. E. Rebrassier, 1411 West Third Ave., Columbus 12, Ohio, executive secretary.

Oklahoma Veterinary Medical Association. Forty-fifth annual meeting. Biltmore Hotel, Oklahoma City, Feb. 1-2, 1960. J. B. Corcoran, P.O. Box 652, Stillwater, Okla., president.

California Veterinary Medical Association. Midwinter conference. University of California, Davis, Feb. 1-3, 1960. Mr. Kenneth Humphreys, 3004 16th St., San Francisco 3, Calif., executive secretary.

Nebraska, University of. Conference on Swine Repopulation. University of Nebraska, College of Agriculture, Agricultural Experiment Station, Lincoln 3, Feb. 3-5, 1960. Inquiries should be directed to: Dr. E. Crosby Howe, Dept. of Animal Pathology and Hygiene, University of Nebraska, Lincoln 3.

American Animal Hospital Association, Region 2. Annual meeting. Robert Meyer Hotel, Jacksonville, Fla., Feb. 4-6, 1960. R. P. Knowles, 2101 N.W. 25th Ave., Miami 42, Fla., chairman.

Colorado State University. Twenty-first annual conference for veterinarians. Glover Veterinary Hospital, College of Veterinary Medicine, Colorado State University, Fort Collins, Feb. 15-17, 1960. O. R. Adams, program chairman.

(Continued on adv. p. 44)

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REFERENCES: 1. Mosier, J. E., and Coles, E. H.: Vet. Med. 53:649 (Dec.) 1958. 2. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

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Illinois State Veterinary Medical Association. Seventy-eighth annual convention. Abraham Lincoln Hotel, Springfield, Feb. 15-17, 1960. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, Ill., executive secretary.

Missouri Veterinary Medical Association. Sixty-eighth annual meeting. Hotel President, Kansas City, Mo., Feb. 21-23, 1960. Paul L. Spencer, P.O. Box 283, Jefferson City, Mo., secretary-treasurer.

Foreign Meetings

International Association of Veterinary Food Hygenists. Second Symposium. Basel, Switzerland, May 15-21, 1960. Dr. A. Clarenburg, 1, Sterrenbos, Utrecht, The Netherlands, president.

First International Congress of Endocrinology. Technical University of Denmark, Copenhagen, July 18-23, 1960. Dr. Christian Hamburger, Statens Seruminstitut, Copenhagen S, Denmark, chairman of the executive committee.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Medical Association, the first Thursday of each month. James L. Chambers, 4307 Normanbridge Rd., Montgomery, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. Dan P. Griswold, Jr., 714 S. 39th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. Cecil S. Yarbrough, 4121 U.S. 90 West, Mobile, Ala., secretary.

Northeast Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ALASKA—Anchorage Group of the Alaska V. M. A., the last Wednesday of each month at Fort Richardson Officers' Club or Thompson's Restaurant, 6th and I Streets, Anchorage, Alaska. Lt. Colonel E. H. Akins, Surgeon's Office, USARAL, Fort Richardson, Alaska, secretary to the Alaska V. M. A.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. John D. Clark, 518 West Oak St., Scottsdale, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. Gwyn Chapin, 2215 E. Calle Vista, Tuscon, Ariz., secretary.

ARKANSAS—Pulaski County Veterinary Medical Society, the second Tuesday of each month. Harvie R. Ellis, 54 Belmont Drive, Little Rock, Ark., secretary-treasurer.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. John S. Blackard, 420 Appian Way, Richmond, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16th St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Paul S. Chaffee, 2333 McKinley Ave., Fresno, Calif., secretary.

Humboldt-Del Norte Counties Veterinary Medical Association, the second Tuesday of January, May, September, and November. Dr. M. Lunstra, P. O. Box 734, Eureka, Calif., secretary-treasurer.

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Kern County Veterinary Medical Association, the first Thursday evening of the month. Francis Dawson, 2007 Nile St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of each month. William P. Matulich, P. O. Box 121, San Luis Obispo, Calif., secretary-treasurer.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. V. Todorovic, 47 Mann Ave., Watsonville, Calif., secretary.

Northern California Association of Veterinarians, the second Tuesday of the month. George Crenshaw, 1137 8th St., Orland, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell in Modesto, Calif. Kenneth E. Erwin, Box 841, Manteca, Calif., secretary.

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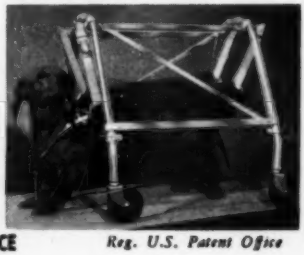

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Orange Belt Veterinary Medical Association, the second Monday of each month. M. C. McSpadden, 2372 West Ramsey, Banning, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. H. M. Stanton, 1122 S.E. U.S. Highway 101, Tustin, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of the month. R. M. Grandfield, 416 Stephens Rd., San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of the month. R. R. Rediske, 833 Vallejo Ave., Novato, Calif., secretary-treasurer.

Sacramento Valley Veterinary Medical Association, the second Thursday of each month with the location specified monthly. Eugene C. Story, 4819 "V" St., Sacramento 17, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of the month. Robert F. Burns, 7572 North Ave., Lemon Grove, Calif., secretary-treasurer.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Barbara G. Shirley, Canoga Park, Calif., secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, Calif., secretary.

San Francisco Veterinarians, every other month—meetings decided at previous sessions. J. Wachs, 317D Sacramento St., San Francisco, Calif., secretary-treasurer.

Santa Barbara-Ventura Counties Veterinary Medical Association, every three months, no set date. Gerald M. Clark, 5415 8th St., Carpinteria, Calif., secretary-treasurer.

Santa Clara Valley Veterinary Medical Association, the last Tuesday of the month. Robert L. King, 1269 Grant St., Santa Clara, Calif., secretary-treasurer.

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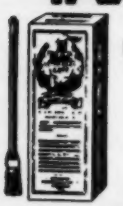

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Southern California Veterinary Medical Association, the third Wednesday of the month. Mr. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

Tulare County Veterinary Medical Association, the second Thursday of each month. F. A. Elliott, 2773 Roby St., Porterville, Calif., acting secretary.

COLORADO—Denver Area Veterinary Medical Society, the fourth Tuesday of every month. Gene M. Bierhaus, 2896 S. Federal Blvd., Englewood, Colo., secretary-treasurer.

Northern Colorado Veterinary Medical Society, the first Wednesday of each month, in Fort Collins. E. J. Carroll, Dept. of Clinics and Surgery, Colorado State University, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Medical Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. A. P. Mayer, Jr., R.F.D. 2, Newark, Del., secretary-treasurer.

DISTRICT OF COLUMBIA—District of Columbia Veterinary Medical Association, the second Tuesday evenings of January, March, May, and October. R. B. Gochenour, 10109 Ashwood Dr., Kensington, Md., secretary-treasurer.

FLORIDA—Big Bend Veterinary Medical Association, meets the first Sunday of each month at 5:00 p.m. at the Tallahassee Dining Room, Tallahassee. C. Paul Vickers, P.O. Box 309, Talahassee, secretary.

Central Florida Veterinary Medical Association, the first Friday of each month at 8:00 p.m., place specified monthly. L. R. Poe, 753 W. Fairbanks Ave., Winter Park, Fla., secretary-treasurer.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg. Fred Jones, 3606 S. Dale Mabry, Tampa, Fla., secretary.

Hillsborough County Veterinary Medical Society, the second Monday evening of each month. For additional information as to the location of each meeting, contact: J. J. Metz, Jr., 5207 Nebraska Ave., Tampa 3, Fla., secretary.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodson's Restaurant, Stephen C. Hite, 5807 105th St., Jacksonville 10, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. John Webb, P.O. Box 183, Cantonment, Fla., secretary-treasurer.

Palm Beach Veterinary Society, the last Thursday evening of each month. McArthur Dairy Building, Four Points, W. Palm Beach. B. W. Bigger, 2833 S. 4th St., Fort Pierce, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. John S. Haromy, Route #1, Box 107-A, Lake Wales, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Joe B. O'Quinn, 1690 E. 4th, Hialeah, Fla., secretary.

Suwanee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. G. L. Burch, P.O. Box 405, Ocala, Fla., secretary-treasurer.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. Robert E. Cope, 127 E. Mason, Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Medical Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Clare L. Bromley, 634 Northside Dr., N.W., Atlanta, Ga., secretary.

Georgia-Carolina Veterinary Medical Association, the second Monday of each month at 8:00 p.m., at the Town Tavern, Augusta, Ga. J. A. Schmitz, 1711 Gwinnett St., Augusta, Ga., secretary.

North Georgia Veterinary Medical Association, quarterly, no set date, the spring meeting at the Veterinary School, Athens, Ga. S. J. Shirley, Commerce, Ga., secretary.

Southeast Georgia Veterinary Medical Association, quarterly, date and meeting place varies. Hugh F. Arundel, P.O. Box 153, Statesboro, Ga., secretary.

South Georgia Veterinary Medical Association, the second Sunday of each quarter at 3:30 p.m., at the Radium Springs Hotel, Albany, Ga. M. W. Hale, Route 2, Tifton, Ga., secretary.

ILLINOIS—Central Illinois Veterinary Medical Association, June 9, Sept. 9, and Dec. 10, 1959. Paul B. Doby, 4 Owens Lane, Springfield, secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month, Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

INDIANA—Calumet Area Veterinary Medical Association, the first Thursday of each month. Bruce Sharp, Box 166, Hobart, Ind., secretary-treasurer.

Central Indiana Veterinary Medical Association, the second Wednesday of each month. P. T. Parker, 224 N. Mill St., Plainfield, Ind., secretary-treasurer.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. Stanton Williamson, 217 W. Chippewa St., South Bend, Ind., secretary.

Northwestern Indiana Veterinary Medical Association, the fourth Thursday of each month, except August, January, and February. Harvey R. Smith, R.R. 2, Box 30, Lowell, Ind., secretary-treasurer.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, P.O. Box 183, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month except June, July, and August at 6:30 p.m., Breeze House, Ankeny, Iowa. S. L. Hendricks, secretary-treasurer.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Veterinary Medical Society, the second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. T. F. Bartley, P.O. Box 454, Cedar Rapids, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, P.O. Box 162, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer Hull, secretary.

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Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, 202 S. Stone St., Creston, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. R. H. Folsom, P.O. Box 323, Danville, Ky., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday of each month in Louisville or within a radius of 50 miles, except January, May, and July. G. R. Comfort, 2102 Reynolds Lane, Louisville, Ky., secretary-treasurer.

LOUISIANA—New Orleans Veterinary Medical Association, the third Thursday of every month at the Monteleone Hotel, New Orleans, at 8:30 p.m. Ronald C. Francis, 6421 Chef Menteur Highway, New Orleans, La., secretary-treasurer.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Leonard D. Krinsky, 6111 Hartford Rd., Baltimore, Md., secretary.

MICHIGAN—Central Michigan Veterinary Medical Association, the first Wednesday of every month at 7 p.m. Jerry Fries, 2070 E. Main St., Owosso, Mich., secretary.

Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November

and December. Robert W. Acton, 4110 Spring Rd., Jackson, Mich.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. Alvin R. Conquest, P.O. Box 514, Grand Blanc, Mich., secretary.

Southeastern Michigan Veterinary Medical Association, the fourth Wednesday of every month, September through May. Louis J. Rossoni, 24531 Princeton Ave., Dearborn 8, Mich., secretary.

MINNESOTA—Lake Region Veterinary Medical Association, quarterly meetings, with time and place specified prior to each meeting. J. A. Strache, Battle Lake, Minn., secretary-treasurer.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kan., secretary.

NEVADA—Western Nevada Veterinary Society, the first Tuesday of each month. Paul S. Silva, 1170 Airport Road, Reno, Nev., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Highes Inn, Hightstown, N. J. David C. Tudor, R.D. 1, Box 284A, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April, except December, at the Irvington House, 925 Springfield Ave., Irvington, N.J. Bernard M. Weiner, 787 Clinton Ave., Newark, N.J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Elks Club, Hackensack. James R. Tanzola, Upper Saddle River, N.J., secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. L. Smith, P.O. Box 938, Trenton, N.J., secretary.

South New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collmont Diner, Collingswood, N.J. Marvin Rothman, 718 Dwight Ave., Collingswood, N. J., secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, the third Wednesday of each month, Fez Club, Albuquerque. Donald W. Fitzgerald, 1825 Lomas Blvd., N.E., Albuquerque, N.M., secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. C. G. Sims, 2450 Battleground Ave., Greensboro, N. Car., secretary.

Eastern North Carolina Veterinary Medical Association, the last Tuesday evening of each month, time and place specified monthly. Byron H. Brow, Box 453, Goldsboro, N. Car., secretary-treasurer.

Piedmont Veterinary Medical Association, the last Friday of each month. J. G. Martin, Boone, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the third Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Asheville, N. Car. H. A. Justus, 924 Lakeside Dr., Hendersonville, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road. G. C. Lewis, 451 E. Galbraith Rd., Cincinnati, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, 3120 Valley View Dr., Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, 8208 Carnegie Ave., Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, 6941 Far Hills Ave., Dayton, secretary.

Geauga County Veterinary Medical Society, the third Wednesday of each month, at the Manor House, Newberry, Ohio, at 1:00 p.m. Peter J. Clemens, Jr., R. D. 2, Chagrin Falls, Ohio, secretary.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. C. Gale, Wooster, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the fourth Tuesday of each month, at 9:00 p.m. Youngstown Maennerchor Club, Youngstown, Ohio. Robert Edwards, 25 Oriole Dr., Youngstown, Ohio.

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Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, 1683 W. Bancroft St., Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, 42 W. Market St., Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Claude A. Tigert, 3032 N.W. 68th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month at the City-County Health Building, 4616 E. 15th St., Tulsa, Okla. Arlen D. Hill, 5302 E. 11th St., Tulsa, Okla., secretary.

Tulsa Association of Small Animal Veterinarians, first and third Mondays. City-County Health Dept. R. H. Featherston, 3129 S. Winston, Tulsa 5, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m. Ireland's Restaurant, Lloyds, 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Robert J. Mallorie, P.O. Box 155, Silverton, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

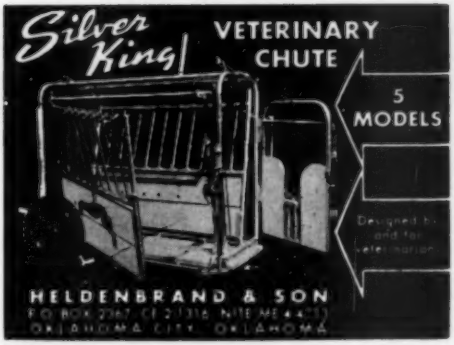
SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

Georgia-Carolina Veterinary Medical Association—see GEORGIA.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. Jack E. Habluetzel, Route 1, Box 65-N, Ingleside, Texas, secretary.

Dallas County Veterinary Medical Association, the first Tuesday of each month at 7:30 p.m., at a place to be specified. Frank N. Black, 12830 Preston Rd., Dallas, Texas, corresponding secretary.

UTAH—Salt Lake Small Animal Hospital Association, the first Monday of every month, at the Holiday Inn, 3040 South State St., Salt Lake City, at 12:15 p.m. Douglas H. McKelvie, 1220 S. State St., Salt Lake City, Utah, secretary-treasurer.



VIRGINIA—Central Virginia Veterinary Association, the second Thursday of each month at 8:00 p.m., except July and August, at a place in Richmond to be announced monthly. Edwin M. Crawford, secretary-treasurer.

Northern Virginia Veterinary Conference Association, the second Tuesday of each month. T. P. Koudelka, P.O. Box 694, Harrisonburg, Va., secretary.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. D. F. Watson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 10415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.) C. R. Carlson, 1109 E. LaSalle Ave., Barron, Wis., secretary.

Coulee Region Veterinary Medical Association, the third Wednesday of every other month. F. N. Petersen, Box 127, Cashton, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. Raymond Pahle, 10827 W. Oklahoma Ave., Milwaukee, Wis.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. L. C. Allenstein, 209 S. Taft St., Whitewater, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. John B. Fleming, 209 E. 4th St., Marshfield, Wis., secretary.

Classified Advertisements

PERSONAL WANT ADS—$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

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15th of month issue — 20th of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the box number, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be sent to the advertiser.

Wanted—Veterinarians

Wanted—assistant veterinarian for small animal practice in the St. Louis area. Good opportunity for the right man. Address Box P 35, JOURNAL of the AVMA.

Wanted—experienced practitioner for A.A.H.A. hospital in Detroit area. Possibilities unlimited. State age, marital status, background, and starting salary desired. Address Box S 27, JOURNAL of the AVMA.

Wanted—experienced veterinarian to manage midwestern small animal hospital. Option to purchase in one year. Salary $7,800. References. Address Box S 29, JOURNAL of the AVMA.

Wanted—veterinarian with California license. Mixed practice in central California. Steady employment. Salary open. Address Box S 33, JOURNAL of the AVMA.

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Veterinarian with graduate degree, ten years small animal, some large animal experience, some cash, desires opportunity to discuss possible association or lease in busy, growing practice. Address Box T 12, JOURNAL of the AVMA.

Wanted—purchase of or partnership in small animal hospital, west coast. Seven years experience own practice. Have $25,000 cash. Address Box T 14, JOURNAL of the AVMA.

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For sale—well-established small animal practice in new hospital, 50 miles from New York City. Real estate, eight acres, business, and equipment: $100,000. Terms, minimum cash $25,000. Unlimited possibilities. Address Box S 5, JOURNAL of the AVMA.

(Continued on adv. p. 54)

Season's Greetings

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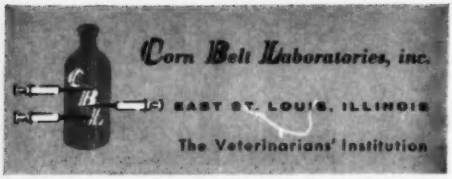

For sale—exclusive small animal hospital, member of A.A.H.A. Modern home recently built, excellent view of ocean, located Maine coast. Address Box I. 28, JOURNAL of the AVMA.

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For sale—Illinois general practice, established 20 years. Price $25,000; includes house, garage, office, equipment, drugs, and office furniture. $5,000 to handle. Address Box S 34, JOURNAL of the AVMA.

For sale—dairy cattle practice in central Minnesota. Real estate, equipment, and drugs. Address Box T 3, JOURNAL of the AVMA.

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For sale—central coast area, California, small animal hospital. Fast-growing area; large animal opportunities if desired. Includes modern 3-bedroom home; excellent climate. Liberal terms if desired. Address Box T 6, JOURNAL of the AVMA.

For sale—one of the most beautiful, modern, best located small animal hospitals in Denver, Colo. area. Lucrative practice with facilities for expansion. Owner retiring. Address Box T 8, JOURNAL of the AVMA.

For sale—predominantly large animal practice. Price $35,000, value of real estate only, includes 3-year-old home, office, and swimming pool. Grossed $35,000 last year. Located in California's San Joaquin Valley. Address Box T 11, JOURNAL of the AVMA.

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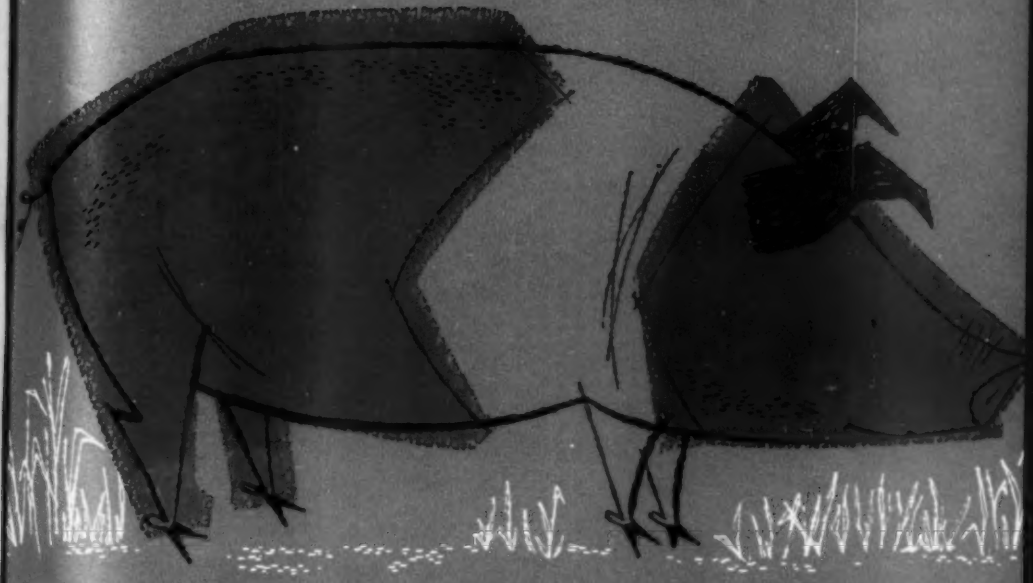

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